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RELATIONSHIPS BETWEEN STUDENTS' CLASSROOM BEHAVIORS AND SELECTED CONTEXT, PROCESS, AND PRODUCT VARIABLES

by

© ROBERT GORDON MAHEN

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Relationships Between Students' Classroom Behaviors and Selected Context, Process, and Product Variables submitted by Robert Gordon Mahen in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Elementary Education.

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Date 18 July 1977

ABSTRACT

The purpose of the study was to examine relationships between students' classroom behaviors with achievement and attitudes toward school. Also examined were the effects of IQ, sex, and socioeconomic status on student behaviors.

Six classes of students, one at each of the first, third, and sixth grade levels in each of two urban schools, comprised the sample of 157 students. Coders were trained in the use of the Coping Analysis Schedule for Educational Settings and approximately 16 hours were spent in each class coding the behaviors of all students in all academic subjects. Behavioral styles were calculated for each student, separately for each academic subject and type of instructional setting. Student achievement was measured in Language Arts by the Metropolitan Achievement Tests and by teacher grades. Social Studies achievement for one class was measured by the Social Studies subtest of the Stanford Achievement Test as well as by teacher grades. Attitude measures used were the My Class Inventory, School Attitude Test, and the Primary Children's Attitude Scale. Intelligence test scores were obtained with the Peabody Picture Vocabulary Test and the Canadian Lorge-Thorndike Intelligence Test. Socioeconomic status for the fathers' occupations was assessed with the Blishen socio-economic scale.

Relationships between students' behavioral styles and the selected variables were determined by correlational analysis. Differences between selected groups of students with respect to sex, achievement, and attitudes were examined by analysis of variance.

Findings indicated that no bivariate relationship with a particular behavioral style was common to all classes, nor was there a relationship with broader categories of behavior that was found for all classes. Achievement variables accounted for the greatest proportion of significant correlations found, and these generally showed a positive relationship with on-task behaviors and a negative relationship with off-task behaviors. A number of significant relationships were found with attitudes. Those satisfied with peer interaction showed no stable pattern in behaviors exhibited. However, satisfaction with instruction was consistently negatively related to off-task behaviors and generally positively related to on-task behaviors. A number of non-straight line relationships occurred with achievement and with attitudes which indicated that less structured instructional settings were appropriate for most students. No consistent differences occurred for on-task behaviors of boys and girls. However, the off-task behaviors of boys was characteristically active, and girls tended to exhibit more passive types of off-task behaviors. Evidence for behavioral differences across academic subjects was inconclusive.

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Chapter 1

INTRODUCTION TO THE PROBLEM

The classroom behavior of students has long been one of the major concerns of educators involved in the preparation and/or evaluation of teachers. Certain conventionally accepted social behaviors are shaped and enforced to ensure the successful operation of the school setting as an educational environment, and are generally assumed to be prerequisite behaviors for learning. Other student behaviors are valued because they are assumed to foster the learning process. Surprisingly, these assumed relationships between student behaviors and learning have rarely been the focus of empirical investigation.

For example, principles of good classroom management is a standard topic in teacher preparation programs and has inspired many textbooks dealing with techniques for facilitating "appropriate" student behaviors on the one hand, and for controlling "inappropriate" behaviors on the other hand. While techniques may vary, there is universal agreement that teaching and learning cannot occur unless the teacher maintains discipline and control in the classroom. Indeed, failure to control student misbehavior is often cited as the most frequent reason as to why beginning teachers become discouraged from further pursuance of a career in teaching. While the volume of literature on this topic is quite extensive, the number of research studies is very small. In a comprehensive review of some 178 classroom-based studies involving the systematic study of teaching, Dunkin and Biddle (1974) found only 3 studies devoted to discipline and group management, all undertaken by Kounin and his associates at the elementary school level (Kounin, 1970; Kounin, Friesen, & Norton, 1966; and Kounin & Gump, 1958). The two earlier studies on discipline dealing with the effectiveness of teacher behavior on student behavior (process-process studies) failed to find teacher-control strategies that worked effectively for student deviancy or on-task involvement. However, the more recent study on group management procedures yielded eight promising variables: two management variables, "withitness" -- communicating to students an awareness of what is going on in the classroom at all times, and "overlappingness" -- ability to simultaneously deal with more than one issue at a time; two variables concerned with the flow of the lesson, "smoothness" and "momentum" -- the absence of teacher behaviors that interfere with the ongoing flow of academic events and that slow down the lesson, respectively; two variables dealing with the teacher's approach to classroom groups during recitation (non-seatwork) activities, "group alerting" -- involving and maintaining student interest in the task, and "accountability" -- making students responsible for their task performances; and two techniques used to maintain interest and avoid satiation, "valence and challenge arousal" -- direct attempts to foster enthusiasm, curiosity, or involvement in academic matters, and "variety" -- the use of different activities in a lesson. For recitation activities it was found that all of these variables except "variety" were significantly positively related to work involvement and freedom from deviancy ($\underline{r} > .276$, $\underline{p} < .05$, $\underline{n} = 49$). For seatwork activities, "withitness", "smoothness", "valence and challenge arousal", and "variety" were significantly positively related to work involvement, and all variables except "accountability" were significantly positively related to freedom from deviancy. Unfortunately, no assessments were made of the students' changes in cognitive achievement or affective status (product measures). The untested assumption in both the literature and research on classroom management and discipline is that some student behaviors are appropriate and therefore must be conducive to learning, while others are inappropriate and therefore detrimental to learning.

In spite of the important status accorded to student behavior for the teaching process, it has received remarkably little attention from researchers as the mediating link between teacher behavior and student products (Berliner, 1976). Dunkin and Biddle (1974) suggest two possible reasons for this situation. First, researchers tend to view teacher behaviors as cause and student behaviors as effect, so that the predominant focus in process-process or process-product studies has been on the relationship between the teacher's behavior and either student behavior or student outcomes. The process-process studies ignore student product measures, which some educators consider to be a most important criteria for judging teaching effectiveness (Coker, 1976; Good, Biddle, & Brophy, 1975; McNeil & Popham, 1973; Rosenshine & Furst, 1971; Spaulding, 1965), and thus obviate the possibility of examining student behavior as a mediating variable. This is also true of many of the process-product studies, where the only processes examined are teacher behaviors. Dunkin and Biddle (1974) suggest this might be because student behaviors are more constrained by classroom rules and are therefore less interesting to observe than teacher behaviors. Further, with 25 to 30 students per classroom there are greater problems deciding upon the focus for observation. Their review of studies on teaching illustrates this phenomenon. Of 178 studies, only 8 reported a direct examination of relationships between student processes and student products (Fortune, Gage, & Shutes, 1966; Furst, 1967a; Hughes, 1973; Sharp, 1966; Soar, 1966; Taba, 1966; Taba, Levine, & Elzey, 1964; and Wright & Nuthall, 1970). An indirect examination of this relationship may be inferred from studies which investigated relationships between teacher process variables and both student processes and student products. Only two studies (Amidon & Flanders, 1961; and Rian, 1969) satisfied these conditions and both of these were experimental inasmuch as they did not deal with naturally occurring classroom events (both used role-playing teachers). Of this total of 10 studies, 8 examined the amount of student talk or responding, and the remaining 2 studies (Taba, 1966; and Taba et al., 1964) investigated students' use of high level thought units. No significant relationships with student achievement were found.

This same review shows that where student behavior was the major focus of investigation, i.e., the behavior modification studies, the emphasis has been on changing student behaviors without considering the effect of such changes on student product measures. Of the 26 studies cited, only 3 examined the relationship between treatment effects and student achievement (p. 171).

The tendency for teachers to intuitively value certain student behaviors because of an assumed relationship to learning, albeit in some nonspecified way, is aptly described by Lahaderne (1968) who remarked:

> Teachers gauge the success of their teaching not so much by the scores their pupils attain on achievement tests as by the involvement pupils demonstrate during ongoing class activities (Jackson & Belford, 1965). They assume that if a child is engrossed in an activity, he is getting something out of it even if that "something" is not identifiable or measurable. (p. 320)

Accordingly, a number of researchers have relied upon the teacher's definitions of acceptable and unacceptable student behaviors and have reported success in modifying the unacceptable behaviors. This has been done with culturally deprived primary school children by Gallagher (1967), Sibley, Abbott, and Cooper (1969), Wasik (1970), and Wasik, Senn, Welch, and Cooper (1969) in conjunction with a compensatory education project (see Spaulding, 1972; and Spaulding & Papageorgiou, 1972). Again, there was no attempt to relate student behavior to student product measures.

In brief, teacher control over student classroom behavior is accepted as a necessary skill for teachers and is assumed to be prerequisite for learning in the classroom. Where student behavior has been studied it has usually been in relation to teaching behaviors or to treatment conditions designed to change student behavior. It has only been within the last ten years that researchers have attended to the possible relationship between student behaviors and student product measures. To use Dunkin and Biddle's (1974) terminology, these studies can be classified either as field surveys (descriptive/correlational studies of naturally occurring classroom events) or as experimental studies (cause-effect studies involving specific teacher and/or program intervention treatments). While these will be reviewed in Chapter 2, a few comments concerning these studies is pertinent here.

First, although there is general agreement that students who exhibit appropriate behaviors tend to have higher achievement scores than those students who display inappropriate behaviors, the number of studies upon which these findings are based is small. Second, these studies suffer many of the same limitations that critics have identified in studies of teaching, i.e., failure to observe the interactive process and relying instead on such criteria as ratings, an orientation which Gage (1963) labelled the "black box" approach; failure to consider contextual effects such as subject matter, type of student, and school setting (Dunkin & Biddle, 1974, pp.14 - 15) which is reflected by studies which have selected too few variables and/or used large groups of students as the statistical unit of analysis; and failure to analyze data for nonlinear as well as linear process-product relationships (Dunkin, 1976; Good et al., 1975; Nuthall, 1974; and Soar & Soar, 1976). Third, most of the studies used standardized achievement tests as the sole product measure, yet many claim that teacher grades may have greater content validity for the students' classroom learning experiences. Further, although the affective growth of students is considered a major educational objective, measures of students' attitudes were rarely used. The requirements for future student process-product studies are best summed up by Soli and Devine (1976) who concluded: "The broad patterns of behavior we call academic achievement may quite possibly be better understood by focusing the research for its observable correlates on smaller, more homogeneous groups of children within the classroom" (p. 340).

PURPOSE OF THE STUDY

This study is designed to examine observable student behaviors in the natural classroom setting and to investigate their relationship with cognitive and affective product assessments. The following questions will be pursued.

1. What is the relationship between students' behavioral Styles and their (a) socioeconomic status (SES), (b) intelligence test (IQ) scores, (c) attitude test scores, (d) academic grades and achievement test scores, and (e) grades based on their classroom behaviors and participation?

2. Is opportunity to respond to process or product questions in class related to particular behavioral Styles?

3. Are there differences in classroom behavioral Styles which are associated with sex of the students?

4. Are there differences among high-, middle-, and low-scoring students on achievement and attitude measures with respect to their Styles of classroom behavior?

5. Are behaviors stable across academic subject areas?

SIGNIFICANCE OF THE STUDY

There is very little known, but a great deal assumed, about the relationship between student behaviors and learning outcomes. There are two major advantages in knowing more about this relationship. First, many of the process-product studies on teacher effectiveness have assumed that teacher behaviors directly affect student learning. However, it is quite conceivable that many of the promising teacher variables identified by Rosenshine and Furst (1971) elicit different student responses, some of which enhance and others which detract from the learning process. Or, it may be that the achievement of some students in a particular situation will occur regardless of specific teacher behaviors (e.g., ability, liking for the subject). If learning-related student behaviors can be found and then considered as a mediating link between teacher behavior and student outcomes, the findings from future studies on effective teaching may yield more promising results than has been generally ascribed to the substantial research efforts of the past (Brophy, 1976; Clifford, 1973; Dunkin & Biddle, 1974; Rosenshine, 1976; Rosenshine & Furst, 1971). Perhaps, as

McNeil and Popham (1973) suggest, "A focus on pupils reveals more about the effectiveness of teachers than does direct study of teachers themselves" (p. 218).

Second, numerous techniques have been developed and refined for the modification of student behaviors. However, this research tradition has been criticized for focusing on decreasing "disruptive" social behaviors rather than on increasing academic productivity, thus strengthening the status quo whereby student docility and obedience are considered as evident of effective teaching (Winett & Roach, 1973). If learning-related student behaviors can be found they might serve as valuable criteria for the application of behavioral modification techniques.

ASSUMPTIONS

The study was based on the following assumptions.

1. The discrete, low inference behavioral categories of the CASES instrument adequately represent all facets of student classroom behavior.

2. Student behavior is influenced by a number of factors other than teacher behavior, such as educational setting, behavior of classmates, individual differences in coping with the demands of school life, and student characteristics (e.g., age/grade, IQ, sex, and SES).

3. The presence of observers did not substantially alter student behavior nor the learning environment during the data collection phase of this study.

4. Both cognitive and affective outcomes are important consequences of the educational process, and that these were reasonably assessed by the various instruments selected for this study.

5. The socioeconomic status of a student is determined by the status accorded the occupation of the parent or guardian in the family who is principal wage earner, and that this was adequately categorized by the Blishen (1967) index.

DEFINITION OF TERMS

Behavioral "Styles": Specific combinations of student behavior categories into patterns which are defined as "coping styles" in the CASES instrument.

Experimental Studies: Studies designed to explore cause-effect relationships involving specific teacher and/or program intervention treatments on student performance measures.

Field survey studies: Descriptive and/or correlational studies of naturally occurring classroom events.

Natural setting: The typical or normal classroom setting.

Non-teacher directed settings: Those classroom learning situations which rely more on the student than on the teacher for attending to the task at hand, e.g., program directed activities, seatwork, free choice activities.

Process studies: Studies which focus primarily on the interactive behaviors of participants in the classroom teaching-learning situation.

Product measures: Assessments of the student's cognitive learning status and attitudes held toward aspects of school life.

Socioeconomic status: A composite index ranking of the social status of an adult's occupation based on educational level, income, and prestige accorded to the occupation.

Teacher directed settings: Those learning situations which are more directly under the control of the teacher, e.g., lectures, demonstrations, teacher-led classroom discussions.

Teacher grades: Those periodic assessments of students' achievement as entered in report cards.

Teacher rating: The rank given to a student by the teacher with respect to his relative achievement status and to his individual attainment of achievement goals held for him by the teacher.

SCOPE AND DELIMITATIONS

The collection of data on student behaviors was restricted to instructional periods when the teacher was present in the classroom. Further, data were collected during a relatively short two-week period near the end of the school year.

Chapter 2

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to set forth a conceptual framework for the study of relationships between student behaviors and student product measures. The review of field survey studies encompasses efforts whereby a number of rating instruments and direct observation schedules were produced in an attempt to describe and categorize student classroom behavior, and for the most part attempted to relate these behavior categories to student achievement scores. The experimental studies, all using direct observation schedules, attempted to discover cause-effect relationships between student behaviors and achievement. All of the studies reviewed in this chapter were conducted with elementary-school-age children as their subjects.

FIELD SURVEY STUDIES

Studies Using Rating Scales

Spivack and Swift (1966) developed the Devereux Elementary School Behavior Rating Scales (DESB) to describe the classroom behavior patterns of normal and emotionally disturbed children. A number of regular and special education teachers produced a list of behaviors which were considered to interfere with or relate to learning. These behaviors were submitted to factor analysis, resulting in the 14 DESB factors for which 111 items were written. Then 252 normal children in regular language arts or arithmetic classes and 327 emotionally disturbed children in special classes were rated on each item by their teachers. Table 1 presents the DESB factors and their relationship to teacher grades. For normal children only, grades were given for both achievement and effort, and because all factors related to achievement were also related to IQ ($p < .01$), the figures shown for them are partial correlation coefficients with the effects of IQ statistically controlled. None of the factors correlated significantly with IQ for the emotionally disturbed children.

The first 12 factors were common to both groups of students while "Impatience" was a factor for normal children only and "Disrespect-defiance" was a factor for the emotionally disturbed children only. "Comprehension" was consistently positively related to teacher grades while "Slowness in work," "External reliance," "Externalization of blame," "Inattentive-withdrawn," "Irrelevant responsiveness," and "Disrespect-defiance" were all consistently negatively related to teacher grades ($p < .01$). "Creative initiative" was the only other factor that was significantly positively related to teacher grades for both groups of students. Normal children were rated higher on one factor only, "Comprehension" ($F = 4.1$, $p < .05$), while the emotionally disturbed children received higher ratings on all other factors except "Inconspicuousness," where no significant differences occurred. The greatest differences between the two groups of students with respect to achievement-related factors common to both groups were with "Externalization of blame" ($F = 96.4$, $p < .01$), "Irrelevant respon-

Table 1

DESB Factors and their Correlations with Teacher Grades for Normal and Emotionally Disturbed Children

Factor name	Normal children[a] Achievement	Normal children[a] Effort	Emotionally disturbed Achievement
1. Creative initiative	.13*	.30**	.26**
2. Classroom disturbance	.13*	NS	-.38**
3. Comprehension	.27**	.50**	.42**
4. Slowness in work	-.26**	-.45**	-.52**
5. External reliance	-.34**	-.41**	-.32**
6. Externalization of blame	-.32**	-.18**	-.37**
7. Inconspicuousness	-.24**	NS	NS
8. Inattentive-withdrawn	-.18**	-.35**	-.34**
9. Irrelevant responsiveness	-.20**	-.23**	-.45**
10. Achievement anxiety	-.20**	-.20**	NS
11. Need for closeness to teacher	NS	NS	.26**
12. Need achievement recognition	NS	NS	NS
13. Impatience	-.14*	-.22**	-.44**
14. Disrespect-defiance	-.20**	-.18**	-.45**

[a] Partial correlation coefficients

*p <.05

**p <.01

siveness" ($F = 96.4$, $p < .01$), and "Achievement anxiety" ($F = 71.2$, $p < .01$).

A further examination of these data pointed to a distinction between social behaviors and learning related behaviors. Factor intercorrelations and consistency of relationships with IQ and achievement suggested that there were two broader classes of behaviors which the authors identified as "acting out or poorly self-controlled behaviors" (factors 2, 4, 6, 9, 13, and 14) and "inability to learn, attend, and actively initiate a course of action without help" (factors 3, 5, and 8). It was speculated that the first grouping (social behaviors) was more apt to evoke teacher management-control behaviors, while the second grouping of (learning-related) behaviors was apt to prompt teacher supportive and helping behaviors. In addition, while "Achievement anxiety" did not fall into either grouping, it was associated with the two externality factors (factors 5 and 6), thus suggesting that this behavior depends more upon what others do than on the student's own actions and under his own control.

Finally, there were several sex-linked differences in behavior ratings. Significant negative correlations ($p < .05$) were reported for males in both student groups on four of the six social behavior categories ("Classroom disturbance," "Slowness in work," "Impatience," and "Disrespect-defiance"), and only one learning-related behavior -- "External reliance." Significant positive correlations ($p < .01$) were reported for girls in both groups on one factor only - "Need for closeness to teacher."

In a second study using the DESB, Swift and Spivack (1968) had 809 children from kindergarten through grade six rated by their teachers in order to establish norms for each factor score across all elementary grades and for both sexes. The final scale contained 41 items grouped into 11 factors and three non-factor items--"unable to change," "quits," and "slow work." This revised scale was identical to the 1966 version except that "Slowness in work" was now a non-factor item and "Inconspicuousness" and "Need achievement recognition" were deleted from the revised version. These factors were then correlated with teacher-assigned achievement grades in reading and arithmetic.

All factors showed significant relationships to teacher grades in both subjects, although the relationship was reported to be generally stronger for arithmetic grades. This latter finding may be artifactual, however, since reading grades were assigned relative to ability groupings of students which may have resulted in more homogeneous scores. Arithmetic grades on the other hand were based on the student's achievement relative to all other children at his grade level. As in the first study the factors "External reliance" and "Comprehension" showed particularly strong relationships with achievement, with $\underline{r}$'s ranging from -.77 to -.27 ($\underline{p} < .01$) and .25 to .89 ($\underline{p} < .05$), respectively. As well, boys were again rated higher on achievement-impeding behaviors, and girls were rated as more capable in meeting the behavioral demands of the classroom. Boys were rated significantly higher on "Classroom disturbance," "External blame," "Achievement anxiety," "Impatience," and "Disrespect-defiance" ($p < .01$) and higher on four of the remaining six factors. Girls were rated significantly higher on "Comprehension" and "Need closeness to teacher" ($p < .01$), the latter which was positively related to achievement in grades one and two. Finally, the similarity of means and standard deviations across grades for behavior ratings indicated that separate norms for each grade were not necessary.

In a third study Swift and Spivack (1969), using another revision of the DESB from which the factor "Need for closeness to teacher" had been dropped, investigated the behaviorally rated behavior between achievers and underachievers from an initial sample of 177 grade five students. Achievement status was assessed using scores obtained on the Iowa Test of Basic Skills (language and nonlanguage areas), as well as report card grades in language arts and arithmetic. Standardized test achievers (A) were those who scored at or above the 85th percentile in both language and nonlanguage subscales when compared with the normative sample, while underachievers (U) scored below the 45th percentile in one subscale and below the 30th percentile on the other. Report card achievers (a) were those who received grades of A or B, while underachievers (u) obtained grades of D or F. Four groups of students were formed: (1) achievers with respect to both measures (Aa), $n = 74$; (2) standardized test achievers but report card underachievers (Au), $n = 9$; (3) standardized test underachievers but report card achievers (Ua), n = 11; and (4) underachievers on both measures (Uu), n = 12. The groups were then compared as to the percentage of students receiving deviant behavioral ratings with respect to the 10 factor of the DESB scale. Unfortunately the authors failed to explain the criteria used for a "deviant" rating.

The achievers (Aa) received the lowest deviant rating percentages of any group. Their highest rating was for "Achievement anxiety" (22%) while percentages for the remaining DESB factors ranged from 1% to 9%. A considerably larger percentage of the Au group received deviant ratings on 9 of the 10 factors. More than 30% of the students received deviant ratings on half of the factors and the range of deviant ratings across all factors was from 11% to 67%. The authors concluded: "These findings indicate that although some children are able to demonstrate high levels of academic achievement, they are unsuccessful in meeting the interpersonal demands of the classroom teacher" (p. 102). The remaining two groups had similar ratings to those of the Au group.

When all 177 students were included and results analyzed on the basis of language arts and arithmetic report card grades only, the relationship between ratings on the DESB scale and achievement was more clearly defined. The percentage of students showing little or no behavioral difficulty decreased, and the percentage showing multiple problems increased, as report card grades declined from A to F. The authors reported that these behavioral differences were significant with respect to report card grades but not with respect to IQ, although they failed to give statistical evidence for this claim. The findings also showed that report card achievers (n = 100) were rated as having substantially fewer behavioral problems than did underachievers, irrespective of level of achievement on the standardized test or overall levels of intelligence. Underachievers (n = 68) were rated as having multiple behavioral problems, some of which necessitated teacher intervention and control, while other reflected their inability to cope with the academic demands of the classroom. The authors suggest that these results support the use of teacher grades in preference to standardized achievement tests.

> The results also call into question the meaning of achievement scores as a reflection of what is learned in the classroom. The present data suggest that, in contrast to teacher grades, such test scores reflect much more than classroom functioning, undoubtedly including general intellectual functioning (and extra-class acquisition of skills and knowledge) and test-taking skills ....for the most precise measurement of classroom functioning it would be well to place more emphasis upon teacher grades and the measurement of those classroom behaviors relevant to such grades. (p. 104)

Kim, Anderson, and Bashaw (1968a) constructed the Child Behavior Scale (CBS) from 66 items taken from five behavioral rating scales. Teachers had chosen those items as being able to make valid judgements about children in their classes without causing embarrassment to the teacher, child, or parent. Ratings were made on 522 grade two students and factor analysis yielded three factors: (1) academic maturity, which characterized the independent, persistent, and responsible child; (2) interpersonal maturity, which was concerned with the child's leadership, participation, and friendliness; and (3) emotional maturity, which was concerned with respect for others and emotional control. The authors then reported (1968b) that the best combination of the three-factor CBS scale was a better predictor of teacher grades in reading, arithmetic, and spelling than was the best combination of subtests from the Stanford Achievement Tests battery (canonical correlation coefficients of .69 and .57, respectively, $p < .01$). The authors admit, however, that the higher correlation between the behavioral factor ratings and grades may be partly caused by the possible dependency between these two measures, i.e., the teacher might have been influenced by the student's grades when rating his behavior.

Meyers, Attwell, and Orpet (1968) administered the linguistics competencies and arithmetic subtests of the California Achievement Tests (CAT) and the language and nonlanguage subtests of the California Tests of Mental Maturity (CTMM) to 57 grade five students from among 100 on whom they had earlier obtained kindergarten test data (psychomotor, linguistic, and figural reasoning development plus the Binet digit-span task) and teacher ratings on characteristics of test behaviors. Stepwise multiple regression procedures revealed that the best kindergarten predictor of grade five test scores was an expressive picture vocabulary task ($r = .50$ for both CAT total achievement and CTMM language IQ scores), but the next best predictors were behavioral ratings of attentiveness and amount of motor activity in the test situation. "Attention" was the best predictor for three of the CAT subtests ("reading words," r = .396; "reading comprehension," r = .434; and "spelling," r = .377) and the second best predictor for two of the remaining six criterion tests. Thus behavior ratings were found to be moderate predictors of achievement occurring four and one-half years later.

A few studies employed both teacher rating scales as well as direct observation of student behavior. Forness (1973) observed 94 lower-middle-class kindergarten students in October and again in March using a modification of Cobb's (1970) system. Observed behaviors were coded into one of two on-task categories (verbal response or attending) or into one of two off-task categories (not attending or disrupting). At the end of each of the two observation phases teachers were asked to rate each child with respect to reading readiness/language development, relationship with other children, and attitude toward classroom rules. It was found the on-task behavior categories accounted for slightly more than 80 percent of the children's classroom behavior while disrupting behavior was practically nonexistent. Both the observed behaviors and teacher rated behaviors showed stability over the five-month time interval.

With reference to the relationship between observed and rated behaviors, teacher ratings in October were moderate predictors of on-task behaviors in March (r = .49) and observed behaviors in

October were moderate predictors of March teacher ratings ($\underline{r}$ = .44). The two off-task categories yielded the strongest relationships in this regard, where the corresponding $\underline{r}$'s for "not attending" were -.48 and -.37, respectively, while the infrequently observed "disrupting" behaviors yielded respective $\underline{r}$'s of -.38 and -.45. Students were then identified as "at risk" with respect to successful school performance if they scored lower than one standard deviation below the mean for observed on-task behaviors in October or behavioral ratings made by teachers in March. Of 18 students identified as "at risk" according to observed behaviors, 10 were "at risk" five months later according to teacher ratings. Although no information was provided to explain whether the decrease in the number of "at risk" students was due to changes in some of the students' behavior patterns or merely because of differences in criteria used by these two methods, the author states that some students labelled "at risk" by teachers did not exhibit this behaviorally, and vice versa. This does point out that direct observation of student behavior might provide useful information to the teacher when assessing the child's response to the learning environment.

In a further analysis of this same data, Forness, Guthrie, and Nihira (1975) grouped students into four clusters based upon percentages of observed on-task and off-task behaviors. Significant differences occurred between the first and fourth clusters only, where the mean percentage of on-task behavior for cluster 1 ($\underline{n}$ = 25) was significantly greater than that for the remaining clusters [$F(1, 90) = 57.1$, $p \leq .01$], whereas it was significantly lower ($F = 30.9$, $p \leq .01$) for cluster 4 ($n = 16$). Cluster 1 was also rated significantly higher on the teacher ratings for reading readiness ($F = 8.415$, $p \leq .01$), peer relationships ($F = 8.514$, $p \leq .01$), and attitudes toward school rules ($F = 6.235$, $p \leq .02$). Cluster 4 was rated significantly lower on peer relationships ($F = 11.819$, $p \leq .01$) and attitudes ($F = 16.463$, $p \leq .01$), and approached significance for reading readiness ($F = 3.031$, $p \leq .08$). Further, cluster 4 students received significantly more teacher attention for both on-task ($F = 5.73$, $p \leq .05$) and off-task behaviors ($F = 36.8$, $p \leq .01$), as well as greater peer response to off-task behaviors ($F = 19.45$, $p \leq .01$). In contrast, cluster 1 students received the least amount of social response to both on- and off-task behaviors. The authors speculate that this was because these students exhibited fewer active behaviors (i.e. "verbal responding" and "disrupting" categories). They further suggest that cluster 4 students could be considered educationally "at risk" on a number of criteria, and that their most salient characteristic was overactivity in both on- and off-task situations. Cluster 1 students, on the other hand, were attentive, asked fewer questions, and did not disrupt the class, all without much effort from the teacher. Finally, the authors suggest that the differences between the behaviors of cluster 4 students with respect to the other groups may have been related to the fact that 75% of this group was comprised of male students, whereas the other groups contained equal numbers of boys and girls. No tests were conducted to test this supposition.

Camp and Zimet (1974) used both teacher ratings and direct observation instruments with 49 grade one students in two classes to examine relationships between student behavior and reading achievement. The two teachers rated their students' behaviors using two instruments: (1) the 96-item Pittsburgh Adjustment Survey Scale designed to measure first grade children's aggressive, passive-aggressive, withdrawn, and prosocial behaviors; and (2) the 39-item Conners Teacher Rating Scale, designed for use in drug studies and measuring factors labelled hyperactive, daydreaming/inattentive, anxious/fearful, defiant/aggressive, and health/social/cooperative. In addition, students' behaviors were independently recorded on a category scale, the most frequently occurring categories being "on-task," "off-task," "deviant," and "non-deviant." Reading achievement and intelligence scores were obtained using standardized tests.

Results showed that the positive behavior subscales of the two rating instruments, "prosocial" and "health/social/cooperative." were significantly related ($\underline{r} = -.60$, $\underline{p} \leqslant .01$, "health" scores were assigned negative values). Further, "anxiety" and "withdrawn" factors from the two scales were also highly related ($\underline{r} = .72$, $\underline{p} < .01$), and all remaining subscales were significantly intercorrelated ($\underline{r}$'s ranging from .32 to .96, $\underline{p} \leqslant .05$), indicating that teachers maintained a response set when rating children. The two teachers gave similar ratings on positive classroom behavior but differed significantly in their ratings of negative behavior ($\chi^2 = 6.90$, $p < .05$) even though the data from independent observations showed that the two classes were very similar. The authors suggest that professionals who rely heavily upon behavioral reports in dealing with children might obtain more reliable information from teachers' assessments of positive behaviors than of negative behaviors. Observed "off-task" behavior correlated with teacher ratings and achievement while observations of "on-task" and "deviant" behaviors did not, although this was probably because the coding procedure used was more apt to record higher incidences of "off-task" behaviors. Further, the authors suggest that behaviors likely to interfere with learning are those which interrupt the student's attention to the task and that behaviors usually considered as inappropriate, such as vocalizing or moving about, may not be interfering with attention to the task. Failure to account for compatibility between behavior and application to the task may be one reason why previous studies have reported insignificant correlations between teacher ratings and observer records of student behaviors.

The study by Solomon and Kendall (1975) illustrates this point. Using the Florida Climate and Control System they recorded student misbehavior and teacher discipline and criticism behavior in three open program and three traditional program classrooms at the grade three and four levels. As well, teacher ratings of students' "undisciplined activity" were also obtained. The observation data showed that although the mean student misbehavior score was nonsignificantly higher for the open classrooms (10.00 vs. 7.75, U = 2, n.s.), the mean score for teacher discipline and criticism behavior was significantly higher for traditional classes (12.58 vs. 5.00, U = 0, $p < .05$). Correlations between teachers' ratings of students' undisciplined activity and type of class showed that teachers in traditional classes perceived more student misbehavior than did open-class teachers ($r = -.33$, $p < .01$), although students themselves did not perceive a significant difference in the general level of disruptiveness between the two types of classes ($r = .05$).

Bloom (1976) investigated the relationship between teacher-student compatibility and teacher ratings of student behaviors. The 115 students for this study had been identified by their 34 teachers as normal ($n = 34$), retainable within the classroom ($n = 41$), or referrable ($n = 40$). Student behaviors were rated on the 58-item Balow School Behavior Profile yielding three factors: poor control, developmental immaturity, and anxious/neurotic. Teacher-student compatibility indices were computed from responses on a self-report questionnaire (the FIRO scale) which rates an individual's expressed behavior toward others and the behavior he expects from others. Multivariate analyses of variance showed no relationship between teacher-student compatibility and nomination of students as normal, retainable, or referrable, although behavioral ratings on the Balow scale indicated significant differences between the normal students and the other two groups. Canonical correlations were then computed to test the relationship between teacher-student compatibility and teacher behavioral ratings. The only relationship occurred with the Balow items indicating severely disturbed student behaviors. The author concluded that this supported the argument that "...school behavior problems and emotional disturbance are discrete entities" (p. 145).

Summary and discussion. The studies reviewed in this section have demonstrated that teacher ratings of student behaviors are moderate predictors of student achievement and that most relationships were in the expected direction. The study by Meyers et al. (1968) showed moderate stability of this relationship over a four-year time interval, although the teacher ratings were only of students' test-taking behaviors - a rather narrow subset of classroom behaviors. Although the relationship was reported to vary with subject area (Swift and Spivack, 1968) it was pointed out this result might have been a statistical artifact. Teacher ratings were also found to be stronger predictors of achievement measured by teacher-assigned grades than were standardized test scores (Kim et al., 1968), although this might have been due to a possible dependency between the two types of teacher assessments. Nevertheless, Swift and Spivack (1969) present a strong argument for the use of teacher grades to measure the student's progress in coping with the academic demands of the classroom. Further, a number of studies revealed that boys were rated as displaying more achievement-impeding behaviors than were girls (e.g., Forness et al., 1975; Spivack & Swift, 1966; and Swift & Spivack, 1968), although studies by Camp and Zimet (1974) and Solomon and Kendall (1975) caution against making a priori judgements about the inappropriateness of behaviors.

It was also shown that although there was moderate agreement between teacher ratings and independent observations of student behavior (Forness, 1973; Forness et al., 1975), notable discrepancies were found. Camp and Zimet (1974) describe the difficulties encountered when trying to compare the results of these two methods, for even if the items used by teachers and observers were identical, direct observation will represent a much smaller segment than will a teacher making a rating. Also, most rating scales have been designed to measure negatively valued behaviors, an observation which is borne out by an examination of the scales used in the studies reviewed in this section. The focus on negative behaviors might be explained by Spivack and Swift (1973), who reviewed the rating scales used in only those studies which investigated relationships between overt student behaviors and achievement. They remarked that the categories in such scales reflected a concern with mental health rather than behaviors associated with productive classroom learning. In their estimate, only 3 of the 19 scales reviewed provided reasonable breadth in behaviors covered, as well as evidence of reliability, validity, and norms data.

As well, studies by Elmore and Beggs (1972, 1975) showed that teacher ratings of students' general classroom behavior were not stable over a relatively short period of time. A total of 87 elementary teachers in the 1972 study and 30 elementary teachers in the 1975 study rated their students with respect to 16 behavioral items on a 5-, 7-, and 9- point scale over a test-retest period of two weeks. Reliability coefficients for each item were not statistically different from zero on each of the rating scales nor were they statistically different across the three rating scales ($\underline{p} > .05$). There was a slight increase in item reliabilities as the number of rating options increased from five to nine. The authors suggested that the teachers, in spite of being instructed to rate the general classroom behavior of students, might have focused instead on specific incidents, thus accounting for the instability in their ratings. The results supported those of four other studies cited by the authors, although two other studies were reported to have shown fairly high test-retest reliabilities for teacher-rated behaviors ($\underline{r}$'s of .50 and .80).

The deficiencies in using rating scales, as described by Spivack and Swift (1973) and Elmore and Beggs (1972, 1975), suggest that direct observation of students' behavior might be a more appropriate approach for classroom use in investigating relationships with student product measures.

Studies Using Direct Observation of Student Behaviors

Perkins (1964, 1965) focused on the behavioral differences between two matched samples of upper-middle class grade five achieving and underachieving students. A total of 72 students from 14 classrooms were matched with respect to sex, IQ, entering reading scores, and classroom membership. Grade point averages based on third- and fourth-grade marks in language, arithmetic, social studies, and science were computed for each student. those students with IQ scores of at least 114 and whose grade point averages fell at least one standard error of estimate below the regression line for the classroom were designated as "underachievers" (n = 36), while those students whose grade point averages fell within one standard error of estimate above the regression line were labelled "achievers" (n = 36). Student behaviors, teacher behaviors, and type of learning activity were coded by trained observers over a five-month period in the subject areas corresponding to those used in computing the grade point averages. Mean percentages were calculated for each student behavior category and comparisons between student groups were made using one-tailed tests of significance. Both achievers and underachievers spent approximately 75 percent of their time engaged in work-oriented behaviors, although this might have been because 75 percent of the observations were made during teacher-directed activities. Achievers spent more time in social work with peers (5.47% vs. 4.21%, $p < .05$) and underachievers exhibited more withdrawal behaviors (10.64% vs. 8.22%, $p < .01$) as well as total off-task behaviors (21.93% vs. 17.69%, $p < .01$). Arithmetic posed more problems for underachievers than did the other subjects, as was evidenced by the greater frequency of withdrawal behaviors when compared to achievers (9.85% vs. 7.34%, $p < .05$). There were no consistent sex-linked behaviors although boys did display more withdrawal behavior than did girls (10.31% vs. 7.13%, $p < .01$). Factor analysis of all of the data showed that work-oriented student behavior, and teacher behavior and teacher learning-facilitative roles (e.g.; leading recitation), were associated with increased academic achievement, whereas student withdrawal and teacher criticism were associated with decreased academic achievement.

Lahaderne (1968) coded behaviors of 125 grade six students on a dichotomous "attentive" versus "inattentive" scale. Achievement scores were obtained on reading and arithmetic with the Scott-Foresman Reading Test and subtests of the Stanford Achievement Tests, while students' attitudes were measured with the Student Opinion Poll and The Michigan Student Questionnaire. Attentive behavior was significantly positively related to reading achievement (r's ranging from .39 to .51, $p < .01$) and arithmetic achievement (r's ranging from .39 to .53) for both boys and girls. Conversely, inattentive behavior was significantly negatively related to achievement in both subjects (r's ranging from -.42 to -.53 and -.39 to -.52, respectively). When the effects of IQ were partialed out, the relationship between attentive behavior and reading achievement remained significant for both boys and girls on the Scott-Foresman scores only ($r_{12.3}$'s of .31 and .26, respectively, $p < .05$), and the relationship with arithmetic remained significant for boys only ($r_{12.3} = .26$, $p < .05$). No relationship was observed between students' attitudes toward school and either attention or achievement, although the possible effect of attitudes may have been overshadowed by constraints placed on students to be attentive. The author concluded that the relationship between attentive behavior and achievement seems to be differentially affected by sex and subject area.

A partial replication of this study was conducted by Samuels and Turnure (1974) with 88 students in grade one. Reading achievement was measured using 45 words randomly selected from the Dolch (1956) list of basic sight words for recognition, and mean achievement scores were compared among quartile groups of students as determined by percentage of attentive behavior. The results confirmed the relationship between attentiveness and reading achievement ($r = .44$, $p < .01$). Further, girls were superior to boys on both achievement [$F(1,79) = 3.96$, $p < .05$] and attentiveness ($t = 3.08$, $df = 86$, $p < .01$), suggesting that the often reported superiority of girls in reading achievement may be mediated by an attending variable.

Cobb (1969) observed the classroom behavior of 103 grade four students in two schools during arithmetic classes in October and March of the 1968-69 school year. Arithmetic achievement scores for both time periods, as well as linguistics competencies scores for October only, were obtained with the *Stanford Achievement Tests*. Additional student data included IQ scores and socioeconomic status. Stepwise regression analysis was carried out on the data from one school only (School A, $n = 60$) and revealed that attention and talking to peers about academic matters were among the first five predictors of arithmetic achievement in all seven subtest analyses of October and March results, and that self-stimulation, complying with teacher requests, and out of chair activities appeared as significant predictors in six of the seven analyses. The final multiple _R_'s ranged from .60 to .72. When multiple regression equations were used to predict linguistics achievement from arithmetic behaviors the results were less consistent, with self-stimulation and talking to peers about academic matters the only consistent behaviors among the first five predictors. Multiple _R_'s ranged from .56 to .72. When IQ, sex, and socioeconomic variables were added into the regression equations, the multiple _R_'s for arithmetic achievement ranged from .77 to .90, and from .74 to .81 for linguistics achievement. Perhaps most significantly, the behavioral categories accounted for up to 19 percent of variance in achievement scores, second only to the contribution accounted for by IQ scores (from 33 to 66 percent of variance). SES never accounted for more than two percent, while sex accounted for up to nine percent of the variance. Finally, the March arithmetic behaviors for School A students were used in cross-validation to predict achievement for School B students. The _r_'s between predicted and actual arithmetic scores ranged from .28 to .54, which were significant for all but one of the seven analyses ($p < .05$) and significant at the $p < .001$ level for five of the seven analyses. Corresponding figures for predicted linguistics achievement were all non-significant (_r_'s ranging from .19 to .24).

In a further description of results from this study, Cobb (1972) suggests that because talking to peers about academic matters was a consistent predictor of achievement, the successful student practices academic skills through his social interactions while the less successful student does not. Also, because compliance was a strong predictor of arithmetic in the cross-validation analysis, the children who follow teacher instructions are more likely to be achievers. He also argues that a combination of specific behavior categories can be highly predictive of arithmetic achievement, as evidenced by the size of the multiple correlation coefficients obtained in both schools.

Similar results were found in a study with 134 grade one children during reading and arithmetic classes (Cobb, 1970). Children spent about 84 percent of their time engaged in appropriate behaviors, which Cobb termed "survival skills." A composite score of all appropriate behavior categories was significantly predictive of achievement in reading ($\underline{r} = .42$, $\underline{p} < .0005$) and arithmetic ($\underline{r} = .31$, $\underline{p} < .0005$), but higher correlations were obtained with multiple regression procedures when using only the best two predictors for reading ($\underline{R} = .59$, $\underline{p} < .01$) and arithmetic ($\underline{R} = .42$, $\underline{p} < .01$). This predictive superiority of small combinations of discrete student behavior categories is in direct contrast to the best teacher behavior predictors of student achievement, which were found by Rosenshine and Furst (1971) to be global in nature. Although the two best predictors of reading achievement (attending and volunteering, r's of .47 and .42, respectively) were not the same as those for arithmetic achievement (looking around and compliance, r's of −.33 and .28, respectively), the stability of behaviors across academic subjects was indicated by the fact that 13 of the 15 behavior categories were significantly correlated with achievement in both subjects and in the predicted direction. When regression analysis was used to cross-validate behaviors and achievement across the two academic subjects, attending behavior was found to be a powerful predictor. From this the author concluded: "A mixture of stability and flux characterize the findings regarding survival skills across academic settings. Some behaviors were crucial to academic success in both settings, while others were situation specific" (p. 65).

When high and low socioeconomic students were compared with respect to the percentage of time engaged in "survival skill" behaviors, the low SES students were found to engage in less appropriate behaviors in reading ($X^2 = 7.25$, $p < .01$) and arithmetic ($X^2 = 16.0$, $p < .001$). The low SES students also showed greater variability in their behaviors, as evidenced by the larger number of behavior categories which correlated significantly with achievement, and the correlation of the composite behavior score with achievement was also greater for this group of students. Sex was a less powerful moderator variable except for behaviors having to do with following the teacher's requests (boys were more compliant during arithmetic than were girls). As in the 1969 study, the most powerful predictions of achievement occurred when behaviors, sex, and SES were used in the regression equations.

Forness (1972) used a modification of Cobb's (1970) category system to code behaviors of 24 male school problem children and their normal male peer members of reading and arithmetic groups at the grade one, two, and three levels. Scores on achievement and intelligence were obtained with standardized tests. All students were of normal intelligence. Results showed that disruptive behavior was almost nonexistent and that attending behavior was most often engaged in by both groups of students, although normal children exhibited higher percentages of attending behavior ($\underline{p} < .003$, two-tailed $\underline{t}$ tests) than did problem children in both reading (66% vs. 53%) and arithmetic (62% vs. 49%). Similar results were found for total attentive behavior (attending plus positive interaction). Conversely, problem children exhibited significantly greater percentages ($\underline{p} < .003$, two-tailed $\underline{t}$ tests) of non-attending behaviors in both reading (23% vs. 13%) and arithmetic (25% vs. 17%). It was also found that the problem students received significantly more attention from the teacher ($\underline{p} < .01$) than did their peers during periods of academic interaction in both reading (10% vs. 7%) and arithmetic (7% vs. 4%), although more than 80% of behaviors received no overt response from anyone. The finding parallels that found in a study cited earlier using teacher ratings of student behaviors (Forness et al., 1975).

In contrast to most other studies, there were no significant relationships between behavioral categories and achievement. The author admits that this might be because of the atypical subjects in this sample who showed extreme variability in their behaviors, and also perhaps because the behavioral categories were not as discrete as those used in other studies. It was also found that teachers expected low socioeconomic students to be more likely in need of more serious intervention treatment, such as placement within special classes, than were students of higher socioeconomic standing, as indicated by the correlation between students' SES and teacher expectations for student referrals ($r = .409$, $p < .05$). Further, teacher expectations were also negatively related to the level of peer attention to the classroom group, indicating that the higher this level the less likely the teacher felt able to cope with the child in her classroom. Finally, high correlations were found between levels of subjects' and peers' attentiveness in reading ($r = .551$, $p < .01$) and arithmetic ($r = .454$, $p < .05$), indicating that the attending behavior of the problem children was a function of their peers' attending behavior even though the levels were significantly different for these two groups of students.

In a follow-up of these 24 problem children one year later, Forness and Esveldt (1975) reported that only 7 students remained in regular classes, while 10 were receiving supplementary services in regular classrooms, 4 were in special classrooms, and 3 were in psychiatric hospitals. The authors noted: "The correlation between severity of intervention and magnitude of each subject's mean discrepancy from his peers in total positive behavior approached significance ($r = .35$, $p < .10$)" (p. 384). This suggested that observed classroom behavior might be a useful tool in early screening of students in need of intervention procedures.

Soli (1974) used Cobb's (1969) category system with 204 grade four children in 7 classrooms to identify behavioral pattern differences among high achievers, average achievers, low achievers, and students referred to the school psychologist because of behavioral problems. High achievers were the top three students in the class on a combined reading and arithmetic score from a standardized test, while low achievers were the three students in each class scoring lowest on this measure. Observations of students' behaviors were made during structured language arts and arithmetic instruction, and both the observation and achievement data were standardized within classrooms before comparing groups across classrooms. Results showed that high achievers when compared with low achievers displayed significantly higher median percentages of total positive behaviors, volunteering, and attending (χ^2's of 10.52, 8.25, and 10.12, respectively, $p < .05$) and significantly lower median percentages of looking around and non-attending behaviors (χ^2's of 10.85 and 8.09, respectively, $p < .05$). There were no significant differences between average and high achievers' behavioral profiles. The referral students when compared to high achievers exhibited significantly higher median percentages of playing, looking around, and non-attending behaviors (χ^2's of

14.27, $p < .01$; 8.76, $p < .05$; and 19.76, $p < .001$, respectively) and significantly lower median percentages of total positive and attending behaviors ($\underline{X}^2$'s of 16.26, $p < .001$; and 14.83, $p < .01$, respectively). The only significant difference between the behavioral profiles of low achievers and referrals was in non-attending behaviors, which were significantly higher for the referral students ($\underline{X}^2 = 9.59$, $p < .05$). However, the author points out that referrals exhibited more than three times the amount of playing behavior (9%) and about half the amount of compliance (1.2%) than did any of the other groups. Further, he claims that differences between the referral and low achieving students emerge when their behaviors are viewed in terms of _deviations_ from those exhibited by average achievers. Here the referrals show more than double the deviation in attending behaviors than did low achievers (12.4% vs. 5.6%) and more than seven times the deviation in non-attending behaviors (6.2% vs. 0.8%). No tests of significance were used for these latter comparisons. He concludes that although both low achievers and referrals are deficient in positive behaviors, the distinction between the two groups is manifested by the nature of their negative behaviors, which is active for referrals and passive for low achievers. Most of the referral group (12 of the 15 students) was comprised of boys. Further, more than half of these would have been placed in the low achievers category had they not been nominated as referrals.

In yet another study using Cobb's category system, Soli and Devine (1976) coded the behaviors of 312 students at the grade three and four levels during arithmetic and verbal skills instruction (including language arts and social studies but not reading) during both teacher-directed and non-teacher-directed settings. Verbal skills achievement was assessed with two subtests of the Gates-McGinitie Reading Test, while arithmetic achievement was measured with tests constructed by the authors and based on classroom work. Using stepwise regression analyses they found that four behavior categories were moderate predictors for total achievement ($\underline{R} = .45$), verbal skills achievement ($\underline{R} = .30$) and arithmetic ($\underline{R} = .45$). Two categories (positive peer interaction and self-stimulation) were common to all three analyses, indicating a moderate degree of behavioral stability across settings. When verbal skills behaviors were used in cross-validation to predict arithmetic achievement the resulting $\underline{r}$ was .29, while the relationship between arithmetic behaviors to verbal skills achievement yielded an $\underline{r}$ of .17.

The students were then divided at the mean of combined achievement scores into high and low achievers. The four best predictors for high achievers (positive peer interaction, initiation to the teacher, inappropriate locale, and noisy behaviors) and the four best predictors for low achievers (playing, not attending, self-stimulation, and complying behaviors) yielded identical moderate $\underline{R}$'s of .44, although the categories were different for both groups. Further, total positive behavior and achievement were found to be more highly correlated among low achievers ($\underline{r} = .27$, $\underline{p} < .001$) than high achievers ($\underline{r} = -.05$, n.s.), and their behaviors were generally more variable than those of high achievers. They concluded: "A primary implication of these results is that, however behavior and achievement are related in the classroom, it is not so simple a relationship that it would be revealed by large group correlations alone" (p. 340).

Papageorgiou (1973) hypothesized that self-directed student behaviors were more predictive of achievement than were conforming behaviors. In an earlier study (see Spaulding & Papageorgiou, 1972) it had been found that student behaviors were a function of specific setting variables, notably that when the setting was teacher-directed the students exhibited a preponderance of conforming behaviors, but when the setting was less structured, as in seatwork or independent study (non-teacher-directed), there were gains by some students in self-directed activity. Using the Coping Analysis Schedule for Educational Settings (CASES) developed earlier (see Spaulding, 1973), the behaviors of 179 culturally deprived elementary children were observed over a four year period in non-teacher-directed settings. It was assumed that the teacher's expectations and reinforcement schedules for these settings would facilitate more self-directed activity for autonomous students, whereas the dependent students would continue to exhibit conforming behaviors. Achievement was measured with the Word Knowledge, Word Discrimination, Reading, and Arithmetic subtests of the Metropolitan Achievement Tests.

Relationships between achievement and behaviors were found to be inconsistent. The composite behavior score, termed the Overall CASES Coefficient, was significantly positively related to Reading subtest scores only ($r = .18$, $p < .05$). Self-directed activity was significantly positively related to Word Knowledge ($r = .19$, $p < .05$), and conforming behaviors were significantly negatively related to Word Knowledge ($r = -.23$, $p < .05$), Word Discrimination ($r = -.23$, $p < .05$) and Reading ($r = -.25$, $p < .01$). When the effects of IQ were partialed out, the Overall CASES Coefficient was predictive of both Reading ($r_{12.3} = .19$, $p < .01$) and Arithmetic achievement ($r_{12.3} = .12$, $p < .05$), and self-directed activity was predictive of both Word Knowledge ($r_{12.3} = .21$, $p < .005$) and Reading ($r_{12.3} = .13$, $p < .05$). This indicated that IQ had acted as a suppressor variable in the relationship of arithmetic achievement with the Overall CASES Coefficient, and for reading achievement with respect to self-directed activity. This study, then, lent some support for the existence of relationships between student behaviors and achievement, and demonstrated the importance of considering the type of setting when analyzing student behavior patterns.

McKinney, Mason, Perkerson, and Clifford (1975) used a modification of Spaulding's (1970) CASES instrument to code the behaviors of 90 grade two children in the fall and spring of the 1972-73 academic year. A composite mean grade equivalent score was computed for each child in the fall and spring using linguistics competencies and arithmetic subtests scores of the California Achievement Tests. With respect to stability of behaviors they found: (1) no marked differences between behavior patterns for boys and girls, although girls showed significantly more self-directed behavior ($F = 5.35$, $p < .05$) and significantly less constructive play behavior ($F = 5.26$, $p < .05$) than did boys in the spring only; (2) significant decreases from fall to spring in distractibility and non-constructive self-directed activity for both boys ($t = 2.72$, $p < .01$, and $t = 2.16$, $p < .05$, respectively) and girls ($t = 3.60$, $p < .01$, and $t = 1.97$, $p < .05$, respectively); and (3) significant correlations between fall and spring frequencies of behavior for six of the twelve behavior categories (r's of .32, .33, .38, and .40 for constructive self-directed activity, distractibility, passive responding, and gross motor activity, respectively, $p < .01$; and r's of .23 and .24 for social interaction and teacher interaction, respectively, $p < .05$).

With respect to the relationship between behaviors and achievement, multiple regression analyses revealed moderate relationships for four behavior categories in the fall ($R = .57$) and in the spring ($R = .50$), although none of the behaviors were common predictors to both analyses. Cross-validation procedures showed that the best behavioral predictors of fall achievement were generally predictive of spring achievement, accounting for 31% of the variance in spring achievement scores. As in Cobb's

(1969) study it was also found that the variance contributed by behavioral data to achievement was largely independent of that provided by ability tests. The authors concluded that the portrait of the competent child was similar to that found by Cobb (1972), Lahaderne (1968), and Samuels and Turnure (1974). "Accordingly, these data indicate that the child who is attentive, independent and task-oriented in his interaction with peers is more likely to succeed academically than the child who is distractible, dependent, and passive in peer-group activities" (p. 202).

Summary and discussion. A notable feature of direct observation schedules is their larger proportion of "positive" behavior categories as compared with rating scales, although such categories still comprise less than half of items included in any schedule. Students were engaged in "appropriate" behaviors most of the time, while disruptive behaviors were almost nonexistent. Interestingly enough, some researchers (e.g., McKinney et al., 1975; Soli, 1974) either omitted disruptive behaviors or combined them with other "inappropriate" categories in their analyses because of their infrequent occurrence, yet the study by Forness (1973) reviewed in the previous section indicated that such behaviors were rather critical factors in the teacher's perceptions of students' behavioral adequacy. The importance of using multiple category instruments was illustrated in two ways. First, the studies by Cobb (1969, 1970) showed that small combinations of discrete categories were stronger predictors of achievement than was a global measure of student behavior, although some support for such a global measure was found by Papageorgiou (1973). Second, while Lahaderne's (1968) dichotomous "attentive-inattentive" behavioral scale yielded significant relationships with achievement (and in the predicted direction), the significance of a non-behavioral category labelled "uncertain" to both achievement and IQ was practically identical to that found for "inattentive" behavior.

The behavioral profiles of academically successful and unsuccessful students as described by McKinney et al. (1975) generally typify the relationships found in all studies between behaviors and achievement, although in making such a statement based upon results with different instruments there is the danger of comparing variables which appear to be similar but in fact are conceptually different (Dunkin, 1976). Also, while most of the relationships confirm general beliefs about student behavior and achievement, other equally plausible relationships were not supported. As Perkins cautions: "This suggests that our intuitive beliefs always need empirical testing" (p. 10).

Where the same instrument was used in different studies or in the same study over different time periods, some behavior categories appeared to be stable while others were specific to the student's age, sex, level of intelligence, and socioeconomic status, as well as to subject area, amount of teacher control over the setting, and time of year. However, very few of the studies considered the effects of one or more of these intervening variables. Further, the affective consequences of classroom learning are held to be important educational objectives, yet only one study (Lahaderne, 1968) examined these in relationship to student behaviors. Studies are needed which consider a larger number of variables impinging upon the relationship between student behaviors and both cognitive and affective product measures, and analyses should be based on more homogeneous groups of students within the classroom than has been the case in the past.

EXPERIMENTAL STUDIES

Werry and Quay (1969) observed small groups of normal and emotionally disturbed children using a scale which grouped behaviors into three broad categories -- deviant behaviors, attention, and teacher contact (student- and teacher-initiated positive and negative contacts). Mean percentages of behaviors were computed separately for each of the three categories. Children ranged from seven and one-half to eleven years of age and were observed in one of four groups: (1) 10 normal children in regular classrooms; (2) 11 conduct problem children matched with the normal group re age, IQ, social class, and ethnic status; (3) 12 conduct problem children in a special class; and (4) 11 conduct problem children in a regular classroom. It was found that on-task attentive behavior was the most frequently occurring category in all groups (53.7% to 77.0%), while physical aggression and daydreaming rarely occurred (1.0% to 3.8%, and 0.2% to 0.8%, respectively). Most of the deviant behaviors were passive-aggressive in nature (i.e. fiddling, doodling, reading comics, playing with toys, etc.). Problem children in the regular classroom exhibited higher mean percentages of running around, noisiness, talking, and general non-working behaviors than did normal students [F's (3,40) significant at $p \leqslant .01$]. However, there were few behavioral differences between the normal students and the matched problem children in the special class, the latter displaying a significantly higher percentage of noise only (14.7% vs. 0.6%, $p \leqslant .01$). The behavior of the other conduct-problem children in the special class was similar to that of the matched problem children. Unfortunately it could not be determined whether the impact of the special class on students' behaviors was due to the program, increased contact with the teacher, or to some combination of both factors.

Kramer (1971) studied the effect of a treatment program designed to increase students' appropriate behaviors, where 14 teachers of grade five and six students ignored inappropriate behaviors and praised appropriate ones. The treatment failed to produce the desired results, but an interactive effect was found with students' IQ, achievement, and behavior. For students of low and average IQ levels there were significant achievement differences in favor of moderately attentive (70% to 79% attending) students compared with low attentive students (less than 70 percent attending). For students with high IQ's, attention at a high level (greater than 79%) made no significant difference to their achievement scores.

In a similar study Matheny and Edwards (1974) had 25 teachers of children in grades one to seven employ an experimental classroom management system involving positive contingencies for desirable behaviors, individualized instruction techniques, and more skilful diagnosis and remediation of reading problems, in an attempt to improve students' reading proficiency, attendance at school, and sense of control over the environment. The program was implemented over a seven-month period. The criterion for successful improvement in student achievement, as measured by standardized tests, was one month's gain in achievement for 60% of the students at each grade level for each month in the program. Attendance data were obtained from school records and students' internal locus of control was measured with the Nowicki-Strickland Internal-External Scale. There was a significant positive correlation between ratings made by the project's staff of teachers' success in implementing contingency management and individualized instruction ($\underline{r} = .79$, $\underline{p} < .01$), and both were significantly related to student gains of at least seven months in achievement ($\underline{r}$'s of .44 and .46, respectively, $\underline{p} < .05$). There were no significant differences in either pre-posttest locus of control scores or in attendance at school. The design of this study makes it impossible to determine whether gains in achievement were primarily associated with the behavior contingency schedule or with the individualized program.

Several studies have attempted to systematically determine the causal relationship between behavior and achievement. Hops and Cobb (1972) investigated the effect of increasing specific "survival skill" behaviors on reading readiness achievement with 62 grade one students in three classrooms, one of which served as a control group ($\underline{n}$ = 20). Survival skills were conceptualized as being either social or academic, and were defined "...as a group of behaviors which act to increase the probability of successful functioning in any education setting" (p. 1). They had been found in previous studies by Cobb (1969, 1970) to be significantly correlated with achievement, and included the positively related behaviors of "attending," "work," and "volunteering" as well as the negatively related category "looking around." Both survival skills and academic responses were assumed to be required for students' successful classroom performance. The frequency of "looking around" behaviors was subtracted from the sum of the frequencies for the three positive categories, and this was then divided by the sum of the frequencies for all 15 behavioral categories coded in order to obtain the proportion of time that each child spent exhibiting "survival skills" behavior. Teachers in the two experimental classrooms used both social and nonsocial reinforcers, vicarious reinforcement, and shaping procedures to increase students' survival skills, and students were observed for five days prior to and five days following the 20 day intervention period. The Gates-McGinnitie Primary A and Gates-McGinnitie Reading Readiness tests were administered prior to the intervention period and again some four to six weeks after the pretest in order to measure gains in achievement.

Two-way ANOVA with repeated measures on one factor showed that experimental students made significantly greater gains in the proportion of survival skills than did the control students (.18 vs. .05), as indicated by significant treatment effects [F (1,26) = 48.71, $p < .0005$] and interaction effects [F (1,26) = 11.38, $p < .005$]. As well, the experimental students' mean gain in achievement (from 50.1 to 61.9) was significantly greater than that for control students (from 51.7 to 58.1) as indicated by treatment effects [F (1,26) = 142.62, $p < .0005$] and interaction effects [F (1,26) = 11.32, $p < .005$]. The authors concluded that teachers can be trained to increase students' survival skills and that such increases can lead to similar increases in academic achievement.

In a further analysis of this same data, using six low achieving children with low rates of survival skills in each of the two experimental classrooms and the control classroom, Cobb and Hops (1972, 1973) reported a replication of these findings. And in yet another report of the same data, with the addition of one more experimental class which had received an individualized reading curriculum but not social skills reinforcement ($n = 19$), Hops and Cobb (1974) found that the curriculum program significantly improved achievement but not survival skills. The implication is that the relationship between behaviors and achievement is unidirectional, i.e., improvement in appropriate behaviors can lead to improved achievement, but improving achievement does not lead to improvement in behavior.

However, a study by Ayllon and Roberts (1974) with five high SES achieving fifth-grade boys, identified by their two teachers as discipline problems, indicated that the reverse relationship was true. The subjects' behaviors were coded as either disruptive or non-disruptive. All 38 students in this team-taught class were given points for correct work on reading assignments, which could be later exchanged for a variety of activities, privileges, and priorities. This reinforcement schedule was implemented for 17 teaching sessions following an 8-session baseline period (no treatment) and again for 6 sessions following a second baseline period of 15 sessions. Results showed that reinforcing academic work caused the subjects' disruptive behavior to drop from 50% to generally less than 25% during the first intervention period, and from 37% to less than 15% during the second intervention period. It was also reported that four of the five subjects showed significant improvements in academic performance. No statistical tests were performed on any of the data. The behaviors assumed to be disruptive were so confirmed by students, who told those exhibiting such behaviors to "shut up" or "go away" during the reinforcement sessions. The authors suggest that teachers who demand classroom order before pursuing academic objectives may not be doing the students a service. They caution, however, that the effect found by reinforcing academic performance alone with high SES achieving students might not be replicable with disruptive low SES children, for these students often exhibit achievement problems as well.

In an earlier study, Ayllon, Layman, and Burke (1972) found that a token reinforcement system applied to reading and arithmetic assignments increased the academic achievement and performance of four highly disruptive, educable mentally retarded boys (aged 12 and 13) in a special class. Gains in reading achievement were particularly dramatic, where reading comprehension improved from a pre-primer to grade two level for two of the boys. This occurred following 19 hours of reinforcement. It was further found that systematically presenting and collecting academic material within a fixed time interval caused disruptive behaviors to drop from a baseline level of 98% to a level of 17%. No statistical tests were performed on the data.

In another study with highly disruptive, educable mentally retarded boys, Winett and Roach (1973) coded the appropriate and inappropriate behaviors of 10 special class students whose average age was 11.5 years. Appropriate behaviors included all those in which there was some involvement with work (e.g., talking to peer about work, laughing and singing while working, requesting assistance, etc.), while inappropriate behaviors were coded if any off-task behavior occurred within the 10 second coding interval. A token reinforcement system was made contingent upon assignments completed in the afternoon only, while morning assignments were simply corrected and handed back to the students. Analysis of variance with repeated measures on both achievement and behavior factors for eight of the students showed a significant increase in work during the reinforcement phase [$\underline{F}$ (1,7) = 35.54, $\underline{p} < .01$], a significant overall difference between morning and afternoon work ($\underline{F} = 12.58$, $\underline{p} < .01$) and a significant interaction effect ($\underline{F} = 17.70$, $\underline{p} < .01$). There was also a significant increase in the overall percentage of appropriate behavior during reinforcement ($\underline{F} = 22.80$, $\underline{p} < .01$) and a significant interaction effect ($\underline{F} = 23.55$, $\underline{p} < .01$). Thus reinforcement contingent upon academic work increased work output and decreased disruptive behaviors. The authors argue on the basis of these results that a wider range of behaviors such as laughter, talking, and moving about, should be considered as appropriate. They admitted, however, that the assignments used to measure achievement were quite similar and therefore assessed a limited aspect of a child's academic development. They also found, as did Ayllon and Roberts (1974), that students themselves reacted negatively to others displaying behaviors which were considered to be "disruptive."

Hundert, Bucher, and Henderson (1976) also found that reinforcing academic performance caused concommitant gains in appropriate behaviors. The subjects were five highly disruptive boys, ranging from 9 to 12 years of age, in a psychiatric hospital school and who had failed at least one grade in school. Behaviors were coded as either appropriate or inappropriate, and arithmetic achievement was measured after each observation session with 48-item assignments. Token reinforcement was made contingent upon appropriate behaviors alone for seven sessions, and then on arithmetic performance alone for five sessions following an intervening baseline period of four sessions. It was found that reinforcing arithmetic performance increased both mean number of correct answers per assignment (from 2.9 to 9.3) as well as mean percentage of appropriate behaviors (from 46% to 77%). However, while reinforcing behavior caused a substantial rise in appropriate behaviors (from 31% to 88%), there was little change in the mean number of correct answers per assignment (from 2.9 to 4.1), although three of the five subjects actually showed a slight drop in arithmetic achievement. The results suggested a one-way dependency between arithmetic performance and appropriate behavior. No statistical tests were used with the data.

Other studies have shown that the behavior-achievement relationship is not simply unidirectional. Ferritor, Buckholdt, Hamblin, and Smith (1972) coded the attending, non-attending, and disruptive behaviors of 14 low socioeconomic grade three students in two classrooms. Intelligence test scores ranged from 65 to 85 with a mean of 75, and five of these students were identified by the teacher as being highly disruptive. A token reinforcement design was used where reinforcement was first made contingent upon attending behavior alone, then on correct work alone, again on behavior alone, on both correct work and attending, again on correct work alone, and finally on both behavior and correct work again. At the end of each day during treatment conditions the children worked for 20 minutes on 100 randomly selected mathematics problems, and were informed each morning on the results of the previous day's work. Reinforcement of academic performance was made contingent upon both the number of correct answers and the percentage of correct answers for problems attempted (i.e., accuracy). Prior to the sequence of treatments, attentive behaviors occurred about 80% of the time and disruptive behaviors about 8% of the time, while the median percentage of correct answers on arithmetic assignments was 54%.

The authors state that the results showed consistent increases in attending behavior and decreases in disruptive behavior when behaviors alone were reinforced, but that there was little effect on achievement. When work alone was reinforced, the number of correct answers remained unchanged but the percent of correct answers increased, while negative effects occurred on behaviors (i.e., attending decreased and disruptions increased). "Only when contingencies were placed simultaneously on attending behavior and on correct work did we find concurrent increases in attending behavior, number of problems worked correctly, and per cent of problems worked correctly" (p. 13). A second study was conducted with nine children from another grade three class in the same school to test possible effects due to the sequence in which treatments were administered. In this study reinforcement was first made contingent upon correct work alone, followed by behavior alone, correct work again, and finally upon both behavior and work. The findings essentially replicated those of the first study. The authors suggest that those who employ behavior modification techniques in the hope of improving academic achievement as a by-product may be misguided. "If one desires improved student performance, better teacher preparation and presentation, or more positive attitudes, contingencies should be structured specifically for each of these target behaviors" (p. 16).

It is difficult to assess this study because the data are presented in graphical form and no statistical tests were used. Further, few summary figures are given. The statements made about the results of the first study are substantiated by comparing the effect of a treatment on the dependent variables to the preceding treatment levels, but not when comparisons are made to the baseline levels of dependent variables. If the former procedure is used with the last figure reported for each of the treatment conditions, the two behavior contingency treatments produced increases in attending behavior of 13% and 23%, decreases in disruption of 7% and 21%, and no consistent effects on either achievement criterion. The two occasions where work alone was reinforced produced decreases of 6% and 9% but showed increases of 3% and 25% in accuracy of responses, while appropriate behavior decreased by 16% and 38% and disruption increased by 6% and 20%. When both behavior and work were reinforced on two occasions there were increases of 5% and 19% in attending behavior, 10% and 13% in number of correct responses, and 1% and 9% in accuracy of responses. All of the figures cited here are approximations. There are other difficulties, however. The superiority of the behavior-plus-work reinforcement schedule might have been because students earned more tokens than during either of the other treatment conditions, despite attempts made by the authors to control for this in their second study. Also, the high baseline level of attending behavior might have limited the effects of the experimental treatments. And finally, students might have responded differently to the conditions imposed for reinforcement under the various treatment schedules.

Walker and Hops (1976) used matched groups of experimental and control subjects from grade one, two, and three classrooms. Students were selected in pairs from their regular classrooms at three different times of the year (September, December, and March). On each occasion 16 pairs of students were selected, one member of each pair being randomly assigned to an experimental group while the other member remained in the regular classroom as a control subject. All subjects were underachievers with at least average intelligence, and who had displayed low rates (less than 60 percent) of appropriate behaviors as determined from observation data. Both verbal and token reinforcement were used to reward the experimental subjects' "survival skills" behavior in the first group, achievement alone in the second group, and both behavior and achievement in the third group. In addition, all three experimental groups were taught using remedial reading and arithmetic programs. Behaviors of experimental subjects were observed using Cobb's system during reading and arithmetic lessons only, while control subjects were observed during other subject lessons as well. Achievement was measured with several standardized tests and means of combined standard scores for both arithmetic and reading were calculated. Analysis of covariance was used with arithmetic achievement, reading achievement, and appropriate behavior as dependent variables, and pretreatment scores on each of these variables as covariates.

The experimental subjects made significantly greater gains than did controls in survival skills behavior [F (1,41) = 34.16, $p < .001$] and achievement in both reading ($F = 4.19$, $p < .05$) and arithmetic ($F = 20.06$, $p < .001$). In addition, no significant differences were found in achievement or behavior among the experimental groups. The authors concluded that the relationship between behavior and achievement is bidirectional, that is, reinforcing achievement also results in behavioral improvement, and reinforcing behavior results in achievement gains as well. The authors attributed the discrepancy between these findings and those of an earlier study (Hops & Cobb, 1974) to the fact that this latest study employed systematic reinforcement as part of the intervention procedure. It is possible, however, that the remedial programs in reading and arithmetic used with the experimental subjects may have accounted for some of their gains in achievement beyond those produced by the treatments. As well, the fact that behavioral observations of control subjects were not restricted to reading and arithmetic lessons might have contributed to the behavioral differences between the two groups of students.

Summary and Discussion Some of the experimental studies appear to support findings from field surveys, e.g., that most students' behaviors are on-task while deviant or disruptive behaviors are rare, even among children categorized as behavior problems (Ferritor et al., 1972; Werry & Quay, 1969). This lends further support to the claim that disruptive behaviors, although infrequent, have a significant impact upon a teacher's perception of the student's ability to cope with the demands of the classroom. Kramer (1971) showed that the relationship between behavior and achievement might be mediated by an intelligence factor. However, attempts to discover a causal relationship between behavior and achievement have been inconclusive. Unfortunately, many of these studies suffer from inadequacies in design and fail to use statistical analyses in testing results. Generalizability is also limited in many cases by the nature of the samples used, such as children with specific psychological or mental deficiencies, and the use of small sample sizes. A case in point is Winett and Roach's (1973) suggestion to expand appropriate behaviors to include laughing, talking aloud, and singing. This might be feasible with small special classes but may not be compatible with learning in a class of 25 to 30 students.

CONCLUSIONS

The state of knowledge about the behavior-achievement relationship, as revealed in the review of literature, suggests that more studies are required. Too little is known about this relationship to be used as a basis for experimental studies. And if results are to be generalized to the actual classroom situation, such studies should be conducted in naturalistic settings. As Nuthall (1974) observed: "Experimental studies can have only a very specialized function and cannot, in the long term, provide a substitute for the correlational studies which deal directly with what actually happens in classrooms" (p. 2).

Chapter 3

DESIGN AND PROCEDURES

The purpose of this chapter is to describe the design, sample, data sources, and procedures used, and to outline the statistical procedures for the analyses of data collected.

THE DESIGN

This study is part of a larger descriptive-correlational group research project on teaching and learning conducted by six doctoral students in the Department of Elementary Education. A survey of recommendations for improving research on teaching revealed some consensus on guidelines for future research. An attempt was made to consider the following guidelines in the design of this process-product component of the larger project.

1. Research on teaching should be conducted in the naturalistic (classroom) setting. Therefore, control over curriculum objectives and materials, instructional setting, and testing procedures is of lower priority than maintaining ecological validity (Bronfenbrenner, 1976; Good et al., 1975, p. 37; Rosenshine & Furst, 1971).

2. Variables should be collected using existing, multifaceted coding instruments that capture a variety of both cognitive and affective interaction variables (Rosenshine & Furst, 1971, 1973; Flanders, 1974).

3. Enough data should be collected to enhance the possibility of obtaining reliability and validity (Good et al., 1975).

4. A small number of teachers and classrooms should be studied to allow both extensive and intensive data collection (personal conversations with Brophy and Shulman, Fall 1975).

5. A variety of student cognitive and affective product measures should be used (Good et al., 1975, p. 37).

The study was limited by the assumptions stated in Chapter 1 and based upon the research evidence presented in Chapter 2. In addition, it was affected by the model which guided the design of the larger project. The model was provided by Dunkin and Biddle (1974) and encompassed contextual variables on students, the classroom, and the community; presage variables on teacher properties and experiences; process variables on teacher and student behaviors; and product variables on student cognitive, affective, and performance outcomes (see Figure 1). The authors recommended that research be pursued which pairs process information with presage, context, or product variables in order to generate information of further practical use to educators (p. 428). A description of the general questions which provided the focus for the larger project can be found in a paper by Eggert, Fasano, Mahen, Marland, Moody, and Muttart (1976). With respect to the model, the study reported herein is a student-process--immediate product investigation.

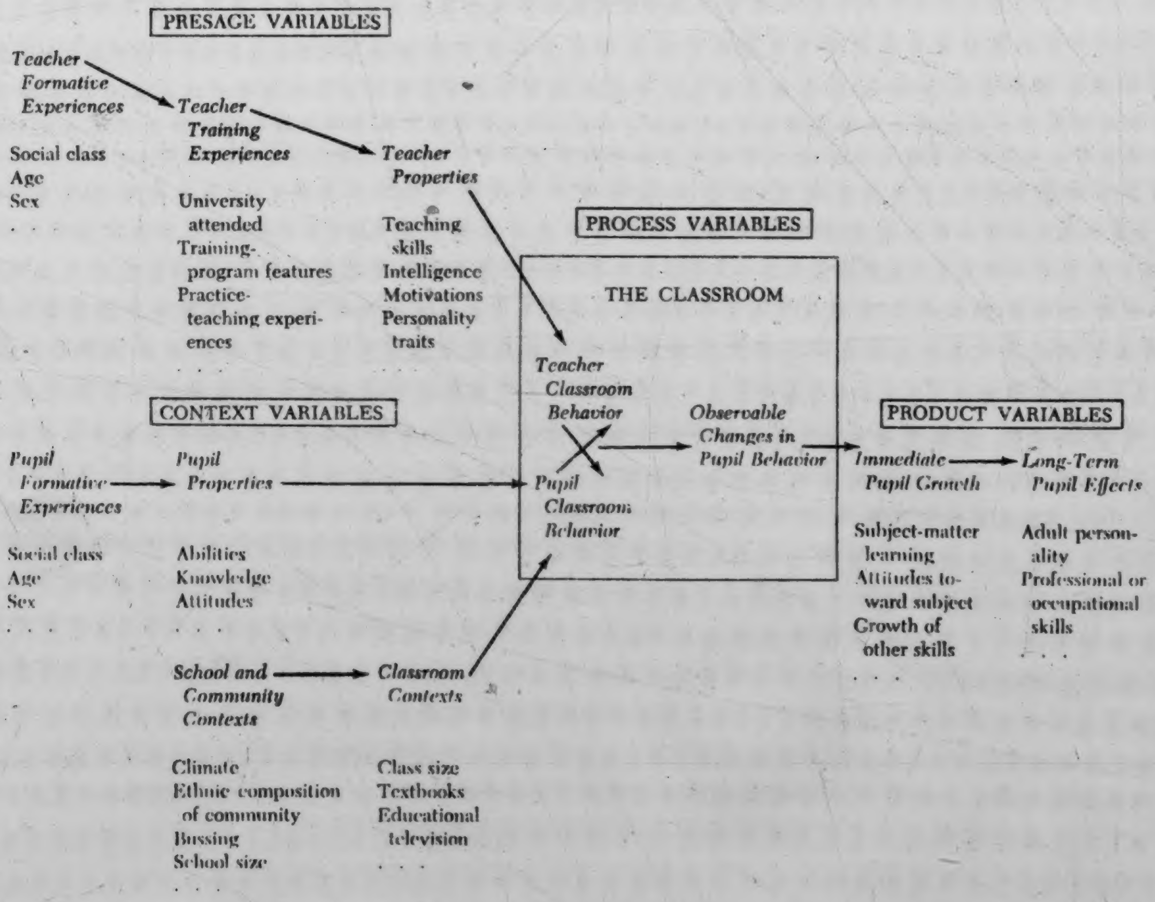

PRESAGE VARIABLES
Teacher Formative Experiences
Social class
Age
Sex
. . .
Teacher Training Experiences
University attended
Training-program features
Practice-teaching experiences
. . .
Teacher Properties
Teaching skills
Intelligence
Motivations
Personality traits
. . .
PROCESS VARIABLES
THE CLASSROOM
Teacher Classroom Behavior
Pupil Classroom Behavior
Observable Changes in Pupil Behavior
CONTEXT VARIABLES
Pupil Formative Experiences
Social class
Age
Sex
. . .
Pupil Properties
Abilities
Knowledge
Attitudes
. . .
School and Community Contexts
Climate
Ethnic composition of community
Bussing
School size
. . .
Classroom Contexts
Class size
Textbooks
Educational television
. . .
PRODUCT VARIABLES
Immediate Pupil Growth
Subject-matter learning
Attitudes toward subject
Growth of other skills
. . .
Long-Term Pupil Effects
Adult personality
Professional or occupational skills
. . .

Figure 1

A Model for the Study of Classroom Teaching

THE SAMPLE

The research sample initially sought consisted of pairs of grade one, three, and six classrooms in each of two randomly selected schools, in order to permit comparisons across schools and grade levels. Approaches were made to a number of schools inviting them to participate in the project. A few teachers in several schools were willing to take part, but due to constraints in time, manpower, and cost, the first two schools in which one teacher at each desired grade level agreed to participate constituted the sample. This resulted in a total sample of 159 students from a kindergarten to grade six student body of 459 in one school and 520 in the other. The characteristics of this sample are presented in Table 2. The two schools were located in an urban district in Western Canada.

Table 2

Distribution of Student Sample by Grade and Sex

Grade	Boys	Girls	Total
1	14	13	27
1	12	10	22
3	12	19	31
3	13	15	28
6	19	6	25
6	13	13	26
Totals	83	76	159

DATA SOURCES

Student Context Data

Intelligence. Intelligence test scores for grade one students were obtained with the Peabody Picture Vocabulary Test (PPVT), Form a,

1959. It is a widely used 150-item scale which the author (Dunn, 1965) describes as "...designed to provide an estimate of a subject's verbal intelligence through measuring his hearing vocabulary" (p. 25). As such it is not a comprehensive measure of intellectual functioning but can provide information useful in predicting school success, particularly in areas calling upon verbal intelligence. The test yields percentile rank, mental age, and intelligence test scores. A reliability coefficient of .67 is reported for alternate forms with six-year-olds. The median congruent validity coefficient for mental ages with those of the 1960 Stanford-Binet test is .83, while the corresponding figures for IQ scores with those of the WISC full scale, verbal scales, and performance scales are .61, .67, and .39, respectively.

Intelligence test scores for grade three and grade six students were obtained with the Verbal and Nonverbal subtests of the Canadian Lorge-Thorndike Intelligence Test (CLT), Form 1, 1967, Levels A and D, respectively. The authors (Lorge, Thorndike, Hagen, & Wright, 1967) claim that the test measures the student's ability to work with ideas, generally accomplished in adult life through the use of verbal symbols. The Nonverbal subtest is purported to parallel the Verbal subtest, and was designed to measure the ability of students for whom the printed word would be an inappropriate basis for intelligence estimates. Each student is provided with Verbal and Nonverbal scores expressed in terms of differential IQ's, age equivalents, grade equivalents, and grade percentiles, as well as a differential IQ score for the total test. The Verbal subtest has yielded split-half reliability coefficients of .945 and .911 for Levels A and D respectively, while the corresponding figures for the Nonverbal subtest are .931 and .911. The correlation between Verbal and Nonverbal scores is reported to be .681 for Level A and .612 for Level D. No validity coefficients are available for this version of the test. However, the Verbal subtest of the American version has shown correlations ranging from the high .70's to low .80's with the verbal scales of the Stanford-Binet and WISC tests, and the corresponding nonverbal coefficients ranged from the high .60's to low .70's.

Socioeconomic status (SES). These data were obtained by applying the categories of Blishen's (1967) socio-economic index for occupations to the parents' occupations as listed in the fall on the student record cards. The underlying assumption for this scale is that "...the family's social status is dependent upon the occupation of the husband rather than the wife when both are working" (p. 42). It is a rank index which is a combination of rankings in terms of education, income, and prestige. The index was constructed with a regression equation using the Pineo and Porter (1967) prestige scores assigned to 88 occupations as the dependent variable, and income and educational levels reported for these occupations in the 1961 Canadian census data as the independent variables. The regression weights were then applied to provide indices for 320 occupations identified on the basis of education and income from the census data (Blishen, 1970).

Student Classroom Behaviors

The classroom behaviors of students were measured with Spaulding and Papageorgiou's (1975) revision of The Coping Analysis Schedule for Educational Settings (CASES), initially developed in 1966 by the senior author (see Spaulding, 1973).

> [It] was developed over a period of approximately seven years as a result of more than 2,000 case studies of normal children in ongoing public school classrooms, Head Start centers, and other educational settings. Its categories are based on ego-theory and reflect a number of dimensions of personality development....Basic to its development were the concepts of "integrative" and "dominative" social behavior as delineated in the work of H.H. Anderson (1939, 1943). In addition to the generally "active" and "passive" styles of child response to environmental stimuli, CASES includes categories which reflect "overt aggression," "passive aggression," "independence," "autonomy," "dependence," "avoidance," and "withdrawal." (Spaulding & Papageorgiou, 1975, p. 1)

Student behavior is coded in one of 13 categories of behaviors, six of which are subcategorized into appropriate or inappropriate behaviors for the setting, as determined by the teacher. All but the twelfth category, "responding to internal stimuli," reflect the person's economy with the external environment, which for this system is considered

> ...to be of crucial importance in the development of his social relations and, ultimately, his overall cultural adequacy....In its present form, CASES provides a comprehensive technique of characterizing overt coping behavior in the classroom (or any social setting). (p. 2)

The categories can be combined to produce coefficients representing eight "coping styles," based on personality development theory, and a composite score called the "Overall Cases Coefficient" (OCC). The eight styles are as follows:

> Style A: Dominative, active aggressive, annoying, bothering, controlling, manipulating
>
> Style B: Resistant, passive-aggressive, delaying, peer-oriented, off-task
>
> Style C: Passive, withdrawn, avoidant, dreamy
>
> Style D: Peer dependent, distractible, off-task
>
> Style E: Attentive, adult-oriented, compliant
>
> Style F: Assertive, socially integrative, task-oriented
>
> Style G: Appropriately task-oriented, independent, self-motivated
>
> Style H: Conforming, passive, submissive to directions (p. 2)

A brief description of the categories and the method for computing the styles and overall cases coefficient can be found in Appendix A. The visibility thresholds for each style were empirically developed so that a coefficient of 1.00, considered to reflect a dominant or visible behavior pattern, represents a point one standard deviation above the mean obtained for each style in a sample of approximately 2,700 students in grades 1 through 12. Styles A to F are typically found as unipolar dimensions in factor analyses, whereas Styles G and H are predominantly opposite poles of a single factor (p. 35). The OCC is a weighted ordinal scale to measure the student's overall success in coping with the educational setting - the higher the score (ranging from 1 to 10), the more successful the student.

Inter-rater reliability is typically reported to range from the mid .80's to the mid .90's. "Construct validity is suggested by the ease with which teachers and others familiar with child development and personality theory have obtained reliability of observation and recording" (p. 4).

The term "coping" was taken from Murphy's (1956) book entitled Methods for the Study of Personality in Young Children. Here techniques are described which were designed to have the young child project his feelings about his personal view of the world and reveal his ability to deal with the situations and problems that confront him in our (adult) culture. Peck (1971), referring to works by Murphy and others, says "...they all appear to agree that effective coping behavior includes actively confronting problems, showing independent initiative in seeking solutions, and displaying persistent effort to arrive at solutions" (p. 89). Much of the underlying personality theory for CASES also came from this book, particularly from sections written by Lerner (Spaulding, 1976) who designed play situations incorporating frustrating experiences (Blocking Techniques) in order to observe the developing ego-organization in young children. He defined the ego

> ...as that aspect of personality which is more or less consistently evoked in specified interpersonal relationships -- or...at least with close reference to such bio-social contexts. Thus considered, it is the "I: Not I" oriented organization of all segmental behavior systems, which is characteristically mobilized in face-to-face interactions with other individuals. (p. 270)

It was assumed that ego-patterns are mobilized in response to direct external or internal stimuli and reflected the person's unified set of ego-values. He described the underlying assumption for his Blocking Techniques in this way: "Given an individual child's selective manner of handling on the one hand his failures, defeats, frustrations, and on the other hand his successes, victories, gratifications, one ought to be able somehow to define such ego-organization in the making" (p. 271).

The concept of "dominative" and "integrative" teacher behaviors reflects the distinction Spaulding makes between teacher-directed (TD) and non-teacher-directed (NTD) settings. Accordingly, children exhibit more conforming behaviors and less spontaneity and initiation in TD than NTD settings. Consequently, data are collected and combined separately for each of these two settings.

Finally, the opportunities given by the teacher to the students to answer questions in class were monitored to see if such opportunities were related to student behavior. These were coded using an expanded version of the Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System (Brophy & Evertson, 1973), a revision of an instrument developed earlier by Brophy and Good (1969). It is a comprehensive low-inference observation instrument designed to capture the naturally occurring sequences and teacher-student (dyadic) verbal exchanges of elementary school classroom interaction. In addition, the instrument takes into account whether the interaction is public or private, and is based on real and psychologically meaningful units of classroom interaction (Brophy & Evertson, 1973; Brophy & Good, 1969). In all, the instrument measures 96 variables grouped into two teacher-afforded categories (public response opportunities and dyadic contacts) and two student-initiated categories (questions/comments and dyadic contacts). A detailed outline of the system is provided in Appendix B. Other variables can be generated from the raw data by combining the variables coded. The authors report that it is possible to train coders to reach an 80% agreement criterion. For purposes of this study process questions were assumed to demand higher-order levels of thinking, while product questions were assumed to require lower-order levels of thought and included both product and choice questions.

Student Product Data

Achievement data. Student achievement data were obtained at each grade level in only those subjects for which observation data had been gathered. These included language arts at all grade levels, mathematics in grades one and three, and social studies in one of the grade six classes. Achievement data were based on standardized tests' scores, report card grades, and teacher ratings.

The linguistics competencies subtests of the Primary I (Form F), Elementary (Form F), and Intermediate (Form G) partial batteries of the Metropolitan Achievement Tests (MAT), 1970

Edition, were administered to grade one, three, and six students, respectively. All students were given the linguistics competencies subtests while students in grades one and three were also given the arithmetic subtests. The authors (Durost, Bixler, Wrightstone, Prescott, & Balow, 1971) report Spearman-Brown split-half reliability coefficients ranging from .88 to .96, and Kuder-Richardson Formula 20 reliability estimates of .91 to .97 for the subtests used in this study. The subtests were assessed as having reasonable content validity by the teachers in this sample. The MAT had been routinely administered in the Fall to the students in this district for a number of years. The authors report that the test was standardized on a sample of approximately 50,000 students representing the American school population in terms of geographic region, size of city, socioeconomic status, and public vs. nonpublic enrolment. It yields standard scores, grade equivalents, percentile ranks, and stanines.

The 54-item Social Science subtest of the Stanford Achievement Test (SAT) 1973 Edition, Form A was also administered to one grade six class. It was chosen by the teacher from a number of standardized tests as being best representative of the social studies content presented to the students in that class. The authors (Madden, Gardner, Rudman, Karlsen, & Merwin, 1973) claim that the test measures high-order reasoning skills (e.g., the ability to infer, to reason, to predict, and to conclude) as well as factual information, and includes the disciplines of geography, history, economics, political science, anthropology, and sociology. The Spearman-Brown split-half reliability for this subtest is .90 and the Kuder-Richardson Formula 20 estimate is .89, based on a subsample of the norming sample of students tested at the beginning of grade six. The total test was standardized in May and October of 1972 with a sample of approximately 275,000 students representing the American school population in terms of geographic region, size of city, socioeconomic status, and public vs. non-public enrolment. It yields scaled scores, grade equivalents, percentile ranks, and stanines. Both the MAT and the SAT are generally considered as among the best standardized test batteries available.

Teacher grades for each student's performance skills' development and academic performance were obtained from the June report card entries. Performance skills' development refers to assessments of the student's (1) conduct as a group member (participation in group discussions, behavior toward rules and authority, cooperativeness as a leader/follower, and consideration of others); (2) conduct as an individual (self-confidence, responsibility, inquisitiveness, and independence), and (3) working skills (responsibility in completing assignments, behavior during independent study, and listening). For academic subjects, separate grades were given for effort (the degree to which the student approached his potential) and achievement (progress in achieving the established goals and objectives of the program). Language arts was graded on the basis of six component skills -- listening, speaking, composition, reading, library, and spelling. For grade one and three students, grades in mathematics and "other" subjects (a combination of science and health, social studies, and printing/handwriting) were also obtained. For one grade six class, social studies grades, based on research skills, reporting skills, knowledge of concepts, and decision-making skills, were obtained in addition to language arts grades.

Because of the limited variance in scores provided by the four-point scale used in report card grades, teachers were asked to rank their students with respect to both achievement and effort. For the latter task teachers were also asked to group students on the basis of having greatly exceeded expectations (G), exceeded expectations (E), met expectations (M), fell below expectations (B), or fell far below expectations (F) with respect to their potential.

Affective data. The affective data for students were obtained with the use of three measures.

1. The My Class Inventory (Anderson & Cayne, 1969) was administered to students at all grade levels. A 45-item questionnaire, it was designed to assess the classroom climate properties of elementary school classes.

> Classroom social climate...includes a profile of measurable class group properties that have significance for research on classes as social groups. These properties include interpersonal relationships among pupils, relationships between pupils

> and their teacher, relationships between pupils and both the subject studied and the method of learning, and finally, pupils' perceptions of the structural characteristics of the class. (Anderson, 1973, p. 1)

The five factors measured are satisfaction, friction, competitiveness, difficulty, and cohesiveness. The reliability coefficients for these factors were reported to range from .54 to .77. Arguments for the validity of each factor are based in prior theoretical and research efforts in the development of an earlier instrument by Walberg and Anderson in 1967, called the Learning Environment Inventory. "Satisfaction" is claimed to affect learning and to be an educational goal in itself; "friction" has negatively correlated with learning measures; "competitiveness" is considered a central concept in group dynamics; and "cohesiveness" is said to distinguish a group's members from nonmembers.

2. Two forms of the School Attitude Test (1973) were used, the Oral Version (Rivera) with grade one students and a Written Version (McCallon) with the remaining students. It was designed to measure the student's perception of the school environment and "...is based upon how the student feels about school in general and how he feels about his interaction with various components of the school environment" (McCallon, 1973, p. 4). The test measures students' attitudes about school in general, student-instruction interaction, and interpersonal relations. The Oral Version contains 29 items and is reported to have yielded a test-retest reliability coefficient of .77 over a 10 day period with a

sample of 50 students from kindergarten to grade three. The Written Version contains 46 items with a reported test-retest reliability coefficient of .78 over a 14 day period with 120 grade four and five students. Validity is argued on the basis of previous research and the selection of items which appeared to teachers as having content validity relating to specific domains of the school environment (e.g., teacher, principal, and peer relationships). It was the only test measuring elementary children's attitudes toward school that was reviewed in Buros (1974).

3. All students in grades three and six were also given the Primary Children's Attitude Scales (Barker Lunn, 1971). This 64-item questionnaire was developed for use with nine-to eleven-year-olds to measure attitudes about aspects of school life. The items were developed from group discussions held with approximately 60 children to find out what attitudes they held and how they were expressed. Statements from these discussions were used in an initial questionnaire submitted to 355 nine-to eleven-year-olds. Factor analysis of the data reduced the questionnaire to 64 items measuring 10 factors: attitude to school, interest in school work, importance of doing well at school, attitude to class, 'other' image of class, conforming vs. nonconforming pupil, relationship with teacher, anxiety in the classroom situation, social adjustment, and academic self-image (Barker Lunn, p. 1). The factors are reported to have internal consistency Alpha coefficients ranging from .58 to .91. Validity is argued on the basis of the high internal consistency of the factors,

and the fact that the first seven factors which deal with attitudes to school and school work intercorrelated significantly ($p < .05$); correlations with other scales to which this one was presumed to relate; and from expected group differences which were predicted on theoretical grounds from other researchers' findings.

PROCEDURES

Training Procedures.

Several weeks prior to the beginning of the study the CASES manual and a half-inch training videotape of two junior high school subjects were obtained from Spaulding. Three of the project researchers involved in collecting student behavioral data (Fasano, Mahen, and Moody) trained for two weeks with this material. The tape emitted a sound signal every 10 seconds so that approximately 56 tallies could be made on each subject. Each of the two subjects was coded four times during this period and observers attained an average of 88.79% exact agreement with the protocols for both subjects on the fourth trial. Exact agreement was calculated using the formula

$$\frac{\text{number of agreements}}{\text{number of agreements + disagreements}} \times 100\%.$$

Training continued in a live elementary school setting for a ten-day period where 36 trials were made. The final trial yielded an average percentage agreement of 87.33% between pairs of coders. Inter-rater agreement between pairs of coders ranged from 31.82%

to 92.00%, with a mean of 65.51%. Part of the reason for the lower percentages was overcome by eventually using an audiotape which emitted signals at 10-second intervals. This served to more accurately standardize the time at which student behaviors were coded. All reliability figures for the training phase are presented in Tables I and II of Appendix C. During the total training period a number of meetings were held to discuss and clarify the categorization of observed student behaviors using the CASES instrument. Further clarification was provided through personal communication with the author.

The other three researchers (Eggert, Marland, and Muttart) trained for a three week period in the use of the Brophy-Good interaction instrument. A detailed description of the procedures used can be obtained by referring to their theses. The procedure for computing reliability figures can also be found in Brophy and Evertson (1973). The results of reliability checks by the three researchers can be found in Table I of Appendix D, and compare favorably with those reported by the authors of the instrument.

The significance of the two observation instruments was assessed by Peck (1971), who noted that prior to their development

> ...systems for analyzing classroom interaction ...treated the individual teacher as one actor in the educational drama. The other actor has been the-class-as-a-whole--a mechanical summation of responses of totally anonymous students, wiping out all individual differences. Such methods... have valuable uses but they are of no use for finding out what the individual student is doing, let alone how the teacher's actions are affecting him. Such systems inherently continue to divert the teacher from examining what she does to the individual student or how well it works. (p. 84)

Data Collection

Researchers worked in pairs during the study, one member of each pair trained in the use of the CASES instrument and the other member in the use of the interaction instrument. Each pair was assigned to work at one specific grade level, visiting each school on alternate days. In an attempt to minimize observer effect on teachers and students, and to allow researchers to become familiar with classroom routines, no data were collected during the first week of the study. Dyadic verbal interaction data were then collected over the next two weeks during language arts lessons at all grade levels, as well as during mathematics lessons in grades one and three only. These subjects were chosen because they constitute the core curriculum at the elementary school level. Neither of the two grade six teachers was responsible for mathematics instruction, although one teacher taught social studies in addition to language arts.

Student behaviors were also coded in all subjects for which the sample teachers were responsible. This was done in an attempt to obtain a minimum of 100 tallies per child in each subject and setting, suggested by Spaulding (1976) as the criterion for data analysis on an individual student basis. All subjects except those specified in the preceding paragraph were combined as an "other" category for coding purposes. Six students were observed at a time in rotation and behaviors were continuously coded until approximately 40 tallies per student were obtained. Then another six students were observed using the same procedure, and so on, until all students in the class were observed, subject to the limitations of class routines. Each data sheet contained the date, time, school and grade, academic subject, setting (TD or NTD), and length of time during which coding occurred. To minimize the possible loss in accuracy which Reid (1970) and Taplin and Reid (1973) noted when observers thought they were not being monitored, periodic reliability checks were made at each grade level. The nine checks resulted in an average percentage agreement among pairs of coders of 77.22%. In addition, five more reliability checks were conducted with the training tape, resulting in an average of 89.85% agreement among pairs of coders. A detailed description of results can be found in Tables III and IV of Appendix C. Within-study reliability checks for the dyadic interaction system can be found in Table II of Appendix D.

During the first week immediately following the observation phase of the study, the attitude tests were administered. Approximately 10 days later, two of the attitude tests (MCI and the Student Attitude Test) were readministered to a random sample of students in each class (see Appendix E), and IQ tests were given to all students. The achievement tests were given during the following week. As well, report card grades were recorded and the SES data obtained from the record cards. When the information on the student record card was insufficient to assign a Blishen scale value, the teacher and/or student was approached for further information. As a result, a measure of SES was obtained for each student.

DATA ANALYSIS

Pearson product-moment correlation coefficients were computed in order to answer the following research questions which were posed in Chapter 1.

1. What is the relationship between students' behavioral Styles and their (a) socioeconomic status (SES), (b) intelligence test (IQ) scores, (c) attitude test scores, (d) academic grades and achievement test scores, and (e) grades based on their classroom behaviors and participation?

2. Is opportunity to respond to process or product questions in class related to particular behavioral Styles?

5. Are behavioral Styles stable across academic subject areas?

Analysis of variance was used to answer the remaining two research questions.

3. Are there differences in classroom behavioral Styles which are associated with sex of students?

4. Are there differences among high-, middle-, and low-scoring students on achievement and attitude measures with respect to their Styles of classroom behavior?

One of the underlying assumptions for this study is that a student's behavior is affected by the behaviors of his classmates as well as by those of his teachers. It is assumed further that each group of classmates and each teacher have particular characteristics which influence the behavior setting of the class in unique ways. Whenever appropriate, the data will be analyzed separately for each of the six classes in this study. For purposes of identification the two grade one classes will be referred to as Class 1-1 and Class 2-1, grade three classes as 1-3 and 2-3, and grade six classes as 1-6 and 2-6.

Since the focus for analysis is primarily one of dealing with small, relatively homogeneous groups of students within classrooms, large-group statistical procedures were generally avoided. A decision was made to divide students into three groups according to scores attained on achievement and attitude measures so that the data could be examined for other than straight-line relationships. To examine further the specific nature of differences in behavior Styles of high- and low-scoring groups, a number of descriptive tables are included which present data on the individual students who comprise the groups under investigation.

Chapter 4

RESULTS OF THE INVESTIGATION

The study was primarily intended to discover the nature of relationships between students' classroom behaviors during instruction and assessments of their achievements and attitudes toward school. As many observations as possible were made on each student at different times of the day during various subject lessons in both teacher directed (TD) and non-teacher directed (NTD) settings. This was done in an attempt to ensure that the behavioral data collected were representative of each student's typical classroom conduct. As a result, students were observed on an average of 14 separate occasions during the two-week observation period. Only those students for whom at least 100 behavior tallies had been obtained with respect to the variable and type of setting under investigation were included in the analyses which follow. Combined student behaviors across all subjects within settings (TD or NTD) were used in investigating relationships between behavioral Styles and both attitude scores and teacher grades awarded to students for their conduct in class. For relationships between behaviors and achievement in a subject area, only those behaviors observed during that particular subject area were used in the analysis. As relatively little time was spent by teachers in mathematics instruction, not enough data were collected to permit analysis for this subject area. In addition, one student was absent during most of the data collection phase of the study and another left the school district. Consequently, the total sample was reduced to 157 students.

Prior to investigating the relationships between behavioral Styles and product variables, decisions were made to select specific attitude and achievement variables from among the many variables in the available pool of data. The items comprising each factor of the three attitude scales were examined to assist in making initial judgements about the appropriateness of the factor and its relationship to other factors. Further, correlation matrices were constructed to determine (1) the interrelationships among test subscales, and (2) the relationships among the various context and product variables which had been chosen for this study. These matrices were also consulted in making decisions about the selection of variables for analysis. The correlation matrix tables for each class can be found in Appendix F.

The My Class Inventory (MCI) measures a student's attitudes toward his classmates and his perceptions about the nature of the social climate of the class. The focus of this scale is different from that of the other two attitude tests used in this study, therefore all five factors of the MCI were included in this analysis. The Oral and Written versions of the School Attitude Test (OSAT and WSAT, respectively) have three factors: (1) interpersonal relations, which overlaps to some extent with the MCI factors; (2) student-instruction interaction, which measures the student's perceptions of the teacher's feelings about him and other class members as well as the manner in which the teacher behaves toward students in the class; and (3) a general school factor which assesses the student's general attitudes toward school. All three factors of this test were included in this analysis as well. The third attitude test, the Primary Children's Attitude Scale (PCAS) was administered to grades three and six students only. Two of its factors -- anxiety in the classroom and academic self-image -- are concerned with the personality of the student and were therefore selected for this analysis. The remaining factors of this scale are similar to those selected from the My Class Inventory and the School Attitude Test, and are excluded from analysis in this section.

The subtests of the Metropolitan Achievement Tests (MAT) were significantly positively intercorrelated ($p < .01$) in all classes except 2-6. In this class the correlation between Word Knowledge and Language subtests was nonsignificant ($p > .05$), while the correlation between Word Knowledge and Spelling was significant ($p < .05$). The Total Reading subtest was chosen for analysis because it is a composite of two subtest skills, Word Knowledge and Reading, and was positively related to all MAT subtests in each of the classes ($p < .01$). The correlation between Language Arts effort and achievement grades reached at least .90 for all classes except 1-1 ($r = .738$, $p < .01$) and for purposes of analysis both grades were combined to form a total Language Arts grade for each student. Similarily, the correlation between Social Studies effort and achievement grades in class 2-6 was .844, and these grades were combined into a total Social Studies grade. Finally, grades given for performance as an individual, performance as a group member, and working skills were combined to form a total behavior grade because of significant intercorrelations in all classes except 1-1. In this class the performance grades were identical for all but one student in the class, and therefore were excluded from analysis. The reader is referred to Appendix F for detailed information about the interrelationships among product variables.

RELATIONSHIPS BETWEEN BEHAVIORAL STYLES AND SELECTED CONTEXT VARIABLES, PRODUCT VARIABLES, AND QUESTION OPPORTUNITIES

The analysis of data in this section is designed to provide answers to the first two research questions. Pearson product-moment correlation coefficients were calculated using the DESTO2 program with the AMDAHL computer facilities of the Division of Educational Research at the University of Alberta. The results are presented separately for each class, and only the statistically significant results are described.

Class 1-1

Table 4.1 shows that behavioral Styles are not significantly related to either SES or IQ. Students who perceive a low degree of friction in the relationships among classmates, as measured by the MCI friction subscale, exhibit social productive (Style F) behaviors in TD settings. Students who feel that school work is difficult display more nonconforming (Style B) behaviors, withdrawn (Style C) behaviors, and self-motivated task-oriented behaviors in TD settings. Those students who perceive that teachers express negative feelings toward them during instruction, as measured by the OSAT student-instruction interaction subscale, are more withdrawn (Style C behaviors) in TD settings. And students who have positive attitudes

Table 4.1

Correlations Between Student Behavioral Styles and Selected Context Variables, Product Variables, and Percentage of Question Opportunities for Class 1-1

Variables	*n*[a]	Styles in TD Settings									*n*	Styles in NTD Settings								
		A	B	C	D	E	F	G	H	OCC		A	B	C	D	E	F	G	H	OCC
CONTEXT	23										27									
SES		-105	224	017	109	036	256	-108	-150	-078		-277	-100	-221	-071	-043	058	156	-099	168
IQ		344	040	-020	179	-258	061	-043	162	-302		-162	057	-320	-234	-087	006	114	189	167
PRODUCT: Attitudes																				
My Class Inventory																				
satisfaction		-192	-131	200	-217	143	164	-129	008	255		-170	-354	047	099	-050	312	029	-030	086
friction		196	063	040	194	187	-425*	134	-324	000		346	224	083	009	-232	-225	066	-203	-075
competitiveness		355	392	128	377	106	-146	-354	-345	-211		212	319	-108	098	116	-110	-187	055	-191
difficulty		-396	431*	611**	-112	061	146	431*	-216	035		122	138	178	049	077	-095	-151	129	-158
cohesiveness		-037	-198	-022	-090	360	-269	066	-350	267		252	307	177	-071	263	-099	-207	157	-158
School Attitude Test																				
general factor		-090	-006	300	-378	-043	360	-209	178	082		191	-045	104	050	-006	351	-124	049	-032
instruction interaction		161	-226	-428*	-091	014	167	016	105	154		084	-099	195	-009	-171	012	107	-166	042
interpersonal relations		100	-087	179	-255	376	-063	-323	-273	309		429*	141	202	088	275	091	-244	011	-179
total		125	-197	-205	-234	095	208	-125	058	219		233	-051	228	032	-058	146	-024	-103	-025
PRODUCT: Achievement	19										27									
Metropolitan Achievement Test																				
Total Reading		-295	060	-182	171	641**	-254	260	-697**	553*		-455*	-427*	-338	-402*	-010	-147	566**	-318	566**
Grades																				
Total Language Arts		-119	-108	-122	-104	654**	-279	534*	-670**	682**		-086	-396*	-105	-484*	-084	-080	571**	-362	572**
PERCENTAGE OF QUESTIONS ASKED																				
Product Questions		-312	-360	207	167	258	124	029	-197	268		-380	-346	-215	043	177	-054	232	-336	215

Note. Decimal points are omitted.

[a] number of students whose frequency of behavioral tallies is > 100.

* *p* < .05

** *p* < .01

concerning interpersonal relations display aggressive, dominative, and manipulative (Style A) behaviors in NTD settings.

With respect to achievement, as measured by the MAT Total Reading subtest and by Language Arts grades, those who attain higher scores display adult dependent (Style E) behaviors in TD settings, self-motivated (Style G) behaviors in NTD settings, and greater overall coping ability (OCC) in meeting the demands of school in both TD and NTD settings. Lower achievement is associated with external motivation to attend (Style H) in TD settings as well as non-conforming (Style B) behaviors and peer-dependent, off-task (Style D) behaviors in NTD settings. In addition, low achievement in Total Reading is also associated with aggressive, dominative, and manipulative (Style A) behaviors in NTD settings. Finally, the opportunity given by the teacher to students to respond to product questions is not significantly related to student behaviors in either TD or NTD settings, although the direction of relationships indicates that the teacher gives fewer opportunities to those students exhibiting "non-productive" behaviors (Styles A, B, and H) in both settings. Only two process (higher-order) questions were asked by the teacher in this class and both were directed to the same student. Therefore, no analyses were performed with this variable for this class.

To better understand the specific nature of the behaviors exhibited by the students, Table 4.2 presents the mean percentage and variance for each of the behavior categories which comprise the eight Styles. It can be seen that disruptive behaviors (Style A categories) are practically nonexistent, as are Style F behaviors in TD settings

Table 4.2

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed and Non-Teacher Directed Settings for Class 1-1

Behavior Style	Category	Language Arts TD Settings (n=19) Mean	Language Arts TD Settings (n=19) Variance	Language Arts NTD Settings (n=27) Mean	Language Arts NTD Settings (n=27) Variance	All Subjects TD Settings (n=23) Mean	All Subjects TD Settings (n=23) Variance	All Subjects NTD Settings (n=27) Mean	All Subjects NTD Settings (n=27) Variance
A	1	—	—	0.02	0.01	—	—	0.02	0.01
	2	0.10	0.08	0.29	0.26	0.11	0.08	0.32	0.25
	3b	0.16	0.18	0.08	0.08	0.16	0.16	0.09	0.12
	9b	0.20	0.73	0.06	0.04	0.16	0.41	0.06	0.04
B	4	0.77	0.58	0.56	1.26	0.82	0.69	0.54	0.96
	5b	4.59	17.12	1.75	5.79	3.91	12.39	1.69	4.26
	7b	0.14	0.11	0.62	0.41	0.26	0.45	0.58	0.38
	8b	1.49	2.38	1.60	3.06	1.23	1.83	1.59	2.76
C	12	1.25	1.76	1.29	1.49	1.25	1.84	1.22	1.46
	13	—	—	0.01	0.00	—	—	0.01	0.00
D	6b	0.29	0.18	2.43	3.72	0.30	0.15	2.22	2.62
	11	4.67	6.45	8.97	25.16	5.07	22.21	8.70	25.04
E	6a	29.84	287.62	1.33	1.00	29.60	241.23	1.49	1.47
	7a	4.66	8.41	1.09	0.68	4.99	7.98	1.07	0.53
	9a	0.56	0.65	2.76	5.39	0.79	1.09	2.72	5.34
F	3a	0.04	0.03	0.14	0.16	0.03	0.02	0.12	0.11
	8a	0.74	0.46	3.30	3.59	0.60	0.36	4.02	3.70
G	5a	1.27	3.68	68.16	118.42	1.03	2.82	68.12	100.63
H	10	49.23	249.29	5.55	15.78	49.66	185.19	5.40	13.10
		100.00		100.01		99.97		99.98	

and Style G behaviors in TD settings. Some behavioral Styles are primarily attributable to the frequency of occurrence of one behavior category rather than to an equal contribution made by each of the component categories. For example, Style B is largely comprised of inappropriate self-directed (category 5b) behavior, Style C to daydreaming or responding to internal stimuli (category 12), Style D to distractibility (category 11), and Style E to close attention to the task (category 6a). The finding cited previously that achievement was positively related to Style E behaviors and negatively related to Style H behaviors in TD settings indicates that the quality of the student's attentiveness to instruction, rather than merely being passively attentive, appears to be an important difference with respect to achievement in this class.

Table 4.2 also shows that half of the behaviors exhibited by students in TD settings involve following instructions, while in NTD settings most of the behaviors are self-motivated and task oriented. Students exhibit approximately equivalent amounts of active (Style B) and passive (Styles C and D) behaviors which are generally considered to be non-productive. However, these only account for approximately 13% of behaviors in TD settings and 17% in NTD settings, while the remaining 85% involves behaviors which are generally considered to be productive (Styles E, F, G, and H).

Class 2-1

The results presented in Table 4.3 for this class reveal that the higher SES students exhibit little self-motivated (Style G) behaviors in TD settings and overall coping ability in NTD

Table 4.3

Correlations Between Student Behavioral Styles and Selected Context Variables, Product Variables, and Percentage of Question Opportunities for Class 2-1

Variables	n^a	Styles in TD Settings									n	Styles in NTD Settings								
		A	B	C	D	E	F	G	H	OCC		A	B	C	D	E	F	G	H	OCC
CONTEXT	21										21									
SES		-124	271	073	154	-139	123	-642**	-003	-237		183	441*	139	426	-230	-154	-235	-076	-477*
IQ		-163	-330	-248	-016	191	159	-220	-013	247		348	462*	-271	-089	-152	140	-157	094	-014
PRODUCT: Attitudes																				
My Class Inventory																				
satisfaction		167	-030	-006	-456*	174	245	041	009	332		077	158	-068	-027	-323	063	152	-361	083
friction		-357	-420	-129	-094	259	-232	210	003	283		032	066	-235	-103	105	242	-250	384	083
competitiveness		-276	-422	-345	-237	-143	-029	271	443*	193		-251	-053	-347	-212	-314	474*	-090	300	338
difficulty		161	-016	-078	324	-007	-279	-279	-074	-197		-015	-007	182	-212	116	097	-108	364	074
cohesiveness		129	-203	-119	-173	-025	076	-137	187	118		022	010	-083	-209	242	-018	090	-063	150
School Attitude Test																				
general factor		-205	010	166	-115	-044	-027	-237	098	-030		-293	073	298	327	-131	008	-162	-123	-252
instruction interaction		402	027	072	223	-217	-068	165	061	-240		-346	-653**	049	-035	370	-337	405	-152	142
interpersonal relations		171	015	438*	448*	-409	-109	027	109	-528*		-251	-314	467*	379	383	-565**	054	068	-430
total		337	027	171	256	-267	-082	107	086	-308		-379	-592**	177	095	-363	-390	322	-131	005
PRODUCT: Achievement	21										19									
Metropolitan Achievement Test																				
Total Reading		-341	-208	-051	-202	062	067	386	084	250		044	-141	-271	004	-354	-230	465*	-446	139
Grades																				
Total Language Arts		-052	101	118	-268	348	-017	263	-258	294	21	-041	-263	-412	-177	-029	143	182	-159	378
Total Behavior		-211	-141	017	-193	476*	-040	213	-317	392		-179	-264	-434*	-201	-062	283	070	131	364
PERCENTAGE OF QUESTIONS ASKED											19									
Process Questions		209	036	-372	054	151	075	245	-142	184		121	-239	-410	-320	659**	-343	222	184	182
Product Questions		429	127	-118	180	215	-181	233	-255	035		444	492*	411	-114	-050	077	-290	225	-238

Note. Decimal points are omitted.

[a] n = number of students whose frequency of behavior tallies is > 100.

* $p < .05$

** $p < .01$

settings, while displaying more nonconforming (Style B) behaviors in NTD settings. The more intelligent children in this class tend to manifest more Style B behaviors in NTD settings.

With respect to attitudes, those students who feel that most classmates are dissatisfied with the class environment demonstrate more peer-dependent, off-task (Style D) behaviors in TD settings. Students who feel that their classmates are competitive are those who are externally motivated to work (Style H behaviors) in TD settings and show social, productive (Style F) behaviors in NTD settings. Those who hold negative attitudes about student-instruction interaction display non-conforming (Style B) behaviors in NTD settings. Finally, students who have positive attitudes about interpersonal relations are withdrawn (Style C behaviors) in both types of settings and are peer-dependent, off-task (Style D) in TD settings. Students with negative attitudes about interpersonal relations show less adequate coping skills in TD settings and exhibit fewer social, productive (Style F) behaviors in NTD settings.

Students who attain higher scores on the MAT Total Reading subtest are characterized by more self-motivated (Style G) behaviors in NTD settings. Teacher grades given for students' behavior are positively associated with Style E behaviors in TD settings and negatively related to Style C behaviors in NTD settings.

More opportunity to answer process questions is given to students displaying adult-dependent (Style E) behaviors in NTD settings, while those students who are non-conforming and peer oriented (Style B) in NTD settings have more product questions directed to them by the teacher.

Table 4.4 presents information regarding the percentage of occurrence of behavior categories within Styles. Several contrasts are evident when these data are compared with those presented in Table 4.2 for class 1-1. For example, for class 2-1 students Table 4.4 reveals that inappropriate social interaction (category 8b) contributes substantially to Style B, while appropriate integrative sharing and helping behavior (category 7a) is a major contributor to Style E. These findings indicate that class 2-1 students participate in more social interaction with one another and play a more active role in instruction than is the case for class 1-1 students. The two classes are otherwise similar with respect to the infrequent occurrence of some behavioral Styles, the passive nature of off-task behaviors, the predominance of on-task behaviors, and the skewness in the distribution of behavior categories.

Class 1-3

Table 4.5 shows that the lower SES students exhibit more peer-dependent (Style D) behaviors in NTD settings. No other significant relationships between SES and behavior Styles exist. The students scoring higher on the IQ test display fewer withdrawn (Style C) behaviors and more self-motivated (Style G) behaviors and overall coping ability in NTD settings. There are no significant relationships between IQ and behaviors in TD settings.

With respect to attitudes measured by the MCI, students who feel that most classmates are dissatisfied with the class display higher incidences of nonconforming (Style B) behaviors in TD settings and more adult-dependent (Style E) behaviors in NTD settings. Those

Table 4.4

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed and Non-Teacher Directed Settings for Class 2-1

Behavior		Language Arts				All Subjects			
		TD Settings(n=21)		NTD Settings(n=19)		TD Settings(n=21)		NTD Settings(n=21)	
Style	Category	Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
A	1	—	—	—	—	—	—	—	—
	2	0.10	0.06	0.31	0.66	0.08	0.04	0.23	0.41
	3b	0.17	0.15	0.14	0.08	0.13	0.09	0.24	0.22
	9b	0.10	0.06	0.39	0.35	0.08	0.04	0.36	0.25
B	4	0.12	0.10	0.05	0.04	0.10	0.06	0.10	0.67
	5b	4.74	17.59	1.09	2.68	4.91	9.02	1.36	2.95
	7b	0.40	0.70	0.08	0.07	0.36	0.50	0.06	0.04
	8b	3.57	12.89	2.27	9.78	3.64	8.12	1.81	6.18
C	12	3.24	5.72	0.87	1.58	2.91	3.88	1.07	1.69
	13	—	—	—	—	—	—	—	—
D	6b	1.63	2.40	1.47	3.99	1.52	1.61	1.16	2.02
	11	7.99	25.78	4.85	18.56	7.77	26.27	6.08	29.88
E	6a	19.61	101.97	1.39	2.19	21.30	82.76	1.43	1.31
	7a	12.27	62.62	0.82	0.44	12.76	49.90	0.83	0.45
	9a	1.09	3.52	3.11	11.75	0.97	2.42	3.10	9.58
F	3a	0.10	0.06	0.09	0.08	0.08	0.04	0.07	0.05
	8a	1.86	4.22	19.89	51.11	1.60	2.60	19.15	40.54
G	5a	1.27	1.91	59.98	114.24	1.19	1.13	59.39	86.98
H	10	41.68 99.94	219.21	3.18 99.98	8.77	40.54 99.94	159.38	3.56 100.00	8.78

Table 4.5

Correlations Between Student Behavioral Styles and Selected Context Variables, Product Variables, and Percentage of Question Opportunities for Class 1-3

Variables	n^a	Styles in TD Settings									n	Styles in NTD Settings								
		A	B	C	D	E	F	G	H	OCC		A	B	C	D	E	F	G	H	OCC
CONTEXT	28										28									
SES		150	-018	-042	019	-092	129	-000	118	-025		223	-041	-285	-403*	149	032	167	169	284
IQ		-239	-122	-303	-313	219	-209	336	126	362		287	002	-494**	-282	-331	329	617*	-342	426*
PRODUCT: Attitudes																				
My Class Inventory																				
satisfaction		-048	-659**	-128	-043	181	109	-057	269	237		-353	-321	-154	-108	-414*	014	394	-337	275
friction		121	293	019	037	-047	-005	-297	-064	-136		258	235	239	379*	110	-377*	-345	205	-409*
competitiveness		083	175	144	486**	-317	076	106	-201	-358		-082	150	198	297	212	-340	-237	205	-293
difficulty		048	345	250	247	-165	102	-161	-276	-313		017	382*	351	443*	258	-015	-538**	018	-507**
cohesiveness		015	053	186	148	-123	208	-038	-087	-168		067	041	270	015	-145	-056	049	-267	-058
School Attitude Test																				
general factor		136	-753**	-389*	-353	410*	-078	028	371	540**		-236	-473*	-478*	-337	-313	-000	473*	019	469*
instruction interaction		218	-259	-000	-083	281	054	-087	-157	170		-408*	-171	086	-120	-167	-046	080	140	054
interpersonal relations		184	025	-035	-064	005	248	-040	031	032		-099	-124	-321	-175	103	054	032	317	171
total		247	-493**	-185	-228	360	068	-052	079	357		-432*	-355	-254	-275	-215	-013	278	185	293
Primary Children's Scale																				
anxiety in classroom		-389*	-593**	-470*	-216	222	-478*	265	464*	446*		-239	-276	-389*	-035	-290	056	351	-276	293
academic self-image		024	-564**	-382	-107	181	-069	053	366	333		-015	-339	-616**	-267	-283	135	499**	-224	503**
PRODUCT: Achievement	19										7									
Metropolitan Achievement Test																				
Total Reading		-377	-432	-534*	-377	227	-402	285	389	508*		079	294	247	431	-149	-239	-356	039	-385
Grades																				
Total Language Arts		-278	-522*	-551*	-276	163	-202	399	382	490*		-309	144	-207	-008	136	274	-139	359	-020
Total Behavior	27	020	-538**	-462*	-384*	331	-157	307	340	546**	28	012	-267	-409	-426*	-648**	075	684**	-451*	557**
PERCENTAGE OF QUESTIONS ASKED	19										7									
Process Questions		-053	-081	051	264	-167	071	-025	030	-173		130	-557	123	063	-489	-189	216	-164	092
Product Questions		294	-041	051	120	009	199	-277	-033	-101		-265	-243	-190	-213	248	-371	-016	605	102

Note. Decimal points are omitted.

[a] n = number of students whose frequency of behavior tallies is > 100.

* $p < .05$

** $p < .01$

students who perceive a high degree of friction in the class demonstrate more peer-dependent (Style D) behaviors, fewer social, productive (Style F) behaviors, and less ability to cope with the demands of school in NTD settings. Students who perceive the class as competitive are characterized by Style D behaviors in TD settings. Those students who indicate that school work is difficult show more Style B behaviors, fewer self-motivated (Style G) behaviors, and less coping ability in NTD settings.

The OSAT instrument reveals that negative general attitudes toward school are associated with Style B and Style C (withdrawn) behaviors in both TD and NTD settings. Conversely, students holding positive general attitudes toward school are adult-dependent (Style E) in TD settings, are self-motivated (Style G behaviors) in NTD settings, and demonstrate greater success in coping with school in both settings. Students exhibiting aggressive (Style A) behaviors in NTD settings have negative attitudes about student-instruction interaction.

The PCAS data reveal that the more anxious (low scoring) students display higher incidences of aggressive (Style A), non-conforming (Style B), and social, productive (Style F) behaviors in TD settings, as well as more withdrawn (Style C) behaviors in both TD and NTD settings. The less anxious students (high scoring) students show more passive response to directions (Style H) and higher coping ability in TD settings. Finally, those students who express negative attitudes about their academic self-image exhibit more non-conforming behaviors in TD settings and more withdrawn behaviors in NTD settings, while students with positive self-images are more self-motivated and better able to cope with school in NTD settings.

With respect to achievement, those students who attain higher MAT Total Reading scores, Language Arts grades, and Behavior grades, show greater overall coping ability and fewer withdrawn (Style C) behaviors in TD settings. As well, students receiving low Language Arts and Behavior grades display more non-conforming (Style B) behaviors in TD settings, and Behavior grades are also negatively related to peer-dependent (Style D) behaviors. The only significant relationships between behavioral Styles in NTD settings occur with Behavior grades, which are negatively related to Styles D, E, and H, and positively related to self-directed (Style G) behaviors and to overall coping competency.

Regarding question opportunities afforded by the teacher, there are no significant relationships between the frequency with which students are called upon to answer either process or product questions and their classroom behavior in TD or NTD settings. It is to be noted that the correlations between student behaviors and the achievement variables and question opportunities are based on only seven students, thus making the size of the confidence limits for these figures quite large.

Table 4.6 shows that integrative sharing and helping behavior (category 7a) is the major component of Style E in TD settings. This finding indicates that students in class 1-3 play a more participative role in instruction during TD settings than was the case for the two grade one classes. Otherwise, class 1-3 behaviors resemble those of

Table 4.6

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed and Non-Teacher Directed Settings for Class 1-3

Behavior		Language Arts		All Subjects			
		TD Settings (n=19)		TD Settings(n=27)		NTD Settings(n=28)	
Style	Category	Mean	Variance	Mean	Variance	Mean	Variance
A	1	—	—	0.04	0.05	0.02	0.01
	2	0.16	0.10	0.16	0.08	0.06	0.03
	3b	0.20	0.54	0.17	0.24	0.02	0.01
	9b	0.03	0.02	0.04	0.02	0.07	0.04
B	4	0.05	0.05	0.10	0.06	0.08	0.04
	5b	1.84	8.40	2.46	7.58	1.36	2.50
	7b	1.24	2.74	1.23	1.90	0.61	0.56
	8b	0.95	1.07	0.93	0.88	2.25	4.28
C	12	2.74	6.72	3.58	12.08	2.60	17.13
	13	—	—	0.02	0.02	—	—
D	6b	0.35	0.40	0.56	0.52	1.48	4.36
	11	8.97	30.96	8.54	24.94	8.36	32.20
E	6a	7.46	23.32	6.73	23.98	1.17	2.82
	7a	12.54	32.57	11.24	31.30	0.33	0.53
	9a	0.12	0.08	0.16	0.07	2.55	9.84
F	3a	0.05	0.04	0.02	0.01	0.04	0.02
	8a	0.07	0.05	0.12	0.08	2.15	4.63
G	5a	1.75	7.70	1.97	4.66	71.75	236.14
H	10	61.45	62.23	61.91	41.66	5.11	28.69
		99.97		99.98		100.01	

classes 1-1 and 2-1. Specifically, Style A behaviors rarely occur and off-task behaviors are more often of a passive nature (Styles C and D). Most student behaviors involve following directions in TD settings and being self-motivated during NTD settings, while total on-task behaviors account for approximately 83% of all behaviors exhibited in TD and NTD settings. As well, the distribution of most behavior categories is skewed.

Class 2-3

The data for class 2-3 are presented in Table 4.7. This table shows that there are no significant relationships between students' SES or IQ and classroom behaviors.

The only significant relationship between attitude variables and behavioral Styles occurs with the interpersonal relationships subscale of the OSAT. Students who have positive attitudes about interpersonal relationships exhibit more Style F behaviors in TD settings and fewer Style A behaviors in NTD settings.

There is a positive relationship between achievement on the MAT Total Reading subtest and the frequency with which students are nonconforming (Style B behaviors) in NTD settings. No significant relationships exist between Language Arts grades and behavioral Styles. In TD settings there are significant negative relationships with Behavior grades and Styles A and B, and positive relationships with Style E and overall coping competency. In NTD settings Behavior grades are positively related to self-directed (Style G) behaviors.

Students exhibiting Style G behaviors in TD settings are more often called upon to answer process questions. The relationship between process question opportunities and passive attending (Style H)

Table 4.7

Correlations Between Student Behavioral Styles and Selected Context Variables, Product Variables, and Percentage of Question Opportunities for Class 2-3

Variables	n[a]	Styles in TD Settings									n	Styles in NTD Settings								
		A	B	C	D	E	F	G	H	OCC		A	B	C	D	E	F	G	H	OCC
CONTEXT	29										31									
SES		-324	068	298	084	-077	001	106	-150	-130		-111	089	-211	085	131	-168	073	-305	041
IQ		-091	-158	102	-011	077	-155	-134	112	023		-011	033	-187	-151	-360	162	153	-011	162
PRODUCT: Attitudes																				
My Class Inventory																				
satisfaction		081	242	024	-037	-193	055	161	-098	-105		068	028	123	-127	-253	033	063	156	040
friction		-248	-180	-059	-015	094	197	-344	236	050		065	-313	-018	-181	-052	396	148	-188	354
competitiveness		-178	007	118	274	132	086	-111	-274	-124		112	008	-119	021	282	096	-143	-020	004
difficulty		-053	342	262	163	-320	-187	-004	-191	-387		035	025	-038	064	211	-017	-127	067	-068
cohesiveness		-040	-056	-151	-030	-050	047	070	120	074		-143	-228	-186	-033	164	070	131	-074	191
School Attitude Test																				
general factor		-212	-169	-059	-012	-059	-001	015	220	068		-214	-285	-095	011	156	-016	176	-068	163
instruction interaction		-100	-109	-085	-157	-149	065	238	247	142		-074	-126	-022	-032	219	001	041	-012	084
interpersonal relations		012	-034	029	-204	-077	399*	088	158	115		-410*	-078	026	088	-172	-048	172	-352	040
total		-138	-141	-070	-162	-140	146	187	283	149		-223	-202	-041	004	172	-016	130	-117	122
Primary Children's Scale																				
anxiety in classroom		-040	076	-097	144	-305	079	-035	124	-179		084	-195	085	-177	055	271	106	-231	259
academic self-image		229	-220	101	-257	228	159	-037	131	247		-076	095	088	-141	034	-207	133	-035	-009
PRODUCT: Achievement	12										13									
Metropolitan Achievement Test																				
Total Reading		—	-198	-013	-240	341	-247	088	003	356		052	568*	203	-253	057	-154	-292	066	-262
Grades																				
Total Language Arts		—	-109	-258	-462	391	-172	012	168	540	31	-147	027	-055	-395	-015	098	316	-275	294
Total Behavior	29	-462*	-568**	-129	-163	376*	169	075	304	482**		-015	-312	-211	-067	-138	-076	368*	-044	238
PERCENTAGE OF QUESTIONS ASKED	12										13									
Process Questions		—	378	138	-295	252	-305	790**	-652*	267		-277	111	498	-136	-030	-163	-245	568*	-216
Product Questions		—	-072	053	-113	-193	-117	348	171	066		-243	137	528	202	-090	-135	-304	124	-352

Note. Decimal points are omitted.

[a] n = number of students upon which correlations are based.

* p < .05

** p < .01

behaviors appears to be a function of the setting in which those behaviors occur. Fewer questions are directed to those students who exhibit Style H behaviors in TD settings, but more questions are asked of those who display Style H behaviors in NTD settings. There are no significant relationships between product question opportunities and students' behavioral Styles.

Two cautions should be noted at this point. First, the relationships between behavioral Styles and both achievement variables and percentage of question opportunities are based on a relatively small number of students, thus making the size of the confidence limits for the reported correlation coefficients quite large. Two-thirds of the significant relationships that were found occurred with this small group of students. Second, the number of significant relationships found in these data is smaller than the number of significant relationships which could have been expected to occur by chance alone.

Table 4.8 shows that fewer types of behaviors were exhibited by these students in Language Arts. This is probably because of the small number of students who satisfied the criterion of at least 100 tallies and could therefore be included in the analysis. This is particularly evident in TD settings, where none of the behavior categories making up Style A was exhibited by students. As noted with previous classes, Style B is predominantly due to inappropriate self-directed (category 5b) behavior; Style C to daydreaming or responding to internal stimuli (category 12); and Style D to visual wandering (category 11) rather than to inappropriate close attentive

Table 4.8

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed and Non-Teacher Directed Settings for Class 2-3

Behavior Style	Category	Language Arts				All Subjects			
		TD Settings(n=12)		NTD Settings(n=13)		TD Settings(n=29)		NTD Settings(n=31)	
		Mean	Variance	Mean	Variance	Mean	Variance	Mean	Variance
A	1	—	—	—	—	—	—	—	—
	2	—	—	0.13	0.09	0.08	0.07	0.19	0.26
	3b	—	—	—	—	0.12	0.07	0.11	0.07
	9b	—	—	0.06	0.05	0.05	0.07	0.18	0.22
B	4	—	—	0.35	0.20	0.32	0.33	0.44	0.35
	5b	7.86	26.31	5.10	18.17	8.83	26.60	4.54	14.70
	7b	0.87	0.42	1.50	2.38	1.12	1.16	1.14	1.34
	8b	3.89	18.92	9.62	35.03	4.09	9.80	8.84	25.46
C	12	2.42	8.51	2.20	5.58	2.37	4.16	2.35	3.96
	13	—	—	0.06	0.05	—	—	0.03	0.02
D	6b	1.45	1.48	2.70	5.37	1.64	1.55	2.25	3.84
	11	10.20	32.61	13.34	40.47	9.19	25.12	10.89	44.92
E	6a	4.22	11.04	0.63	0.30	4.70	10.48	0.63	0.52
	7a	8.43	19.77	0.75	1.13	7.35	13.36	0.88	1.31
	9a	—	—	2.08	5.72	0.44	0.66	2.71	11.07
F	3a	—	—	0.07	0.06	0.08	0.05	0.04	0.03
	8a	0.35	0.44	4.37	14.28	0.21	0.16	7.00	37.86
G	5a	2.28	8.64	53.21	107.36	2.98	8.06	53.83	124.97
H	10	58.02	55.68	3.81	15.68	56.44	56.11	3.90	9.23
		99.99		99.98		100.01		99.95	

behavior (category 6b). The same observations with respect to the absence of extremely deviant behaviors, the prevalence of overall on-task behaviors, and skewness in distribution of behaviors can be made about this class as were made for the classes mentioned previously. The incidence of total off-task behavior (Styles A to D) is higher for this class than for previous classes, ranging from about 27% in TD settings to 32% in NTD settings.

Class 1-6

The data for this class, presented in Table 4.9, are restricted to relationships concerning behaviors in TD settings only, because the teacher rarely used non-teacher directed strategies of instruction. There is a significant positive relationship between SES and social, productive (Style F) behaviors, and a significant negative relationship between IQ and non-conforming (Style B) behaviors. No other significant relationships exist between behavioral Styles and either SES or IQ.

With respect to attitudes measured by the MCI, those students who perceive a high degree of friction in the class exhibit few Style B behaviors and greater overall coping ability. Those who feel that schoolwork is considered by the class to be difficult display adult-oriented (Style E) behaviors. Students who perceive the class to be a cohesive group are characterized by peer-dependent (Style D) behaviors. Regarding attitudes measured by the OSAT, students who are generally satisfied with school engage in more Style E and Style F behaviors. And finally, those

Table 4.9

Correlations Between Selected Student Context and Product Variables and Student Behaviors in Teacher-Directed Settings for Class 1-6

Variables	n[a]	Behavioral Styles								
		A	B	C	D	E	F	G	H	OCC
CONTEXT	25									
SES		-178	-064	163	020	-046	405*	107	023	-013
IQ		-195	-406*	-208	-249	196	229	298	235	388
PRODUCT: Attitudes										
My Class Inventory										
satisfaction		-164	229	022	258	-255	-225	-161	-006	-280
friction		-245	-427*	-389	-301	178	-067	-026	380	404*
competitiveness		-046	326	-002	-101	-286	-165	-191	050	-250
difficulty		051	-261	-354	-042	402*	035	-008	-032	372
cohesiveness		-165	036	342	499*	-381	030	-050	077	-372
School Attitude Test										
interpersonal relations		-007	359	152	-153	-039	211	-004	-244	-155
instruction interaction		-293	-117	-382	-188	205	-050	239	052	295
general factor		-149	049	-171	-328	448*	423*	333	-327	335
total		-245	020	-276	-276	291	172	277	-142	281
Primary Children's Scale										
anxiety in classroom		060	-070	141	188	-014	136	444*	-088	-007
academic self-image		069	224	272	-244	-014	308	278	-210	-073
PRODUCT: Achievement	25									
Metropolitan Achievement Test										
Total Reading		-171	-325	-318	-155	081	203	368	276	321
Grades										
Total Language Arts		128	-186	-182	-195	407*	556**	518**	-170	401*
Total Behavior		-128	-191	-197	-176	372	447*	478*	-135	385
PERCENTAGE OF QUESTIONS ASKED										
Process Questions		-104	-249	-290	-072	294	217	291	010	346
Product Questions		-074	058	066	-122	322	019	330	-344	152

Note. Decimal points are omitted.

[a] n = number of students whose frequency of behavior tallies is > 100.

* $p < .05$

** $p < .01$

who are most anxious in the classroom, as measured by the PCAS, exhibit more self-directed (Style G) behavior.

No significant relationships exist between MAT Total Reading scores and behavioral Styles. Students who have higher grades in Language Arts and Behavior are characterized by social productive (Style F) behaviors, and self-directed (Style G) behaviors. In addition, students with higher Language Arts grades are those who exhibit adult-oriented (Style E) behaviors and greater coping competency. There are no significant relationships between behavioral Styles and percentage of either process or product question opportunities.

Table 4.10 reveals that the off-task behaviors of students in this class tend to be predominantly active in nature (i.e., Style B) than was the case for other classes discussed. Total off-task behaviors (Styles A to D) account for approximately 27% of all behaviors, and in this respect this class is similar to class 2-3. Observations with regard to infrequently occurring Styles and categories, major categories in each Style, and skewness in distribution of behaviors are similar to those reported for other classes.

Class 2-6

The data for this class are presented in Table 4.11. There are no significant relationships between the SES of students and their behavioral Styles. Students' IQ scores are significantly positively related to non-conforming (Style B) behaviors and self-directed (Style G) behaviors in TD settings, and to overall coping

Table 4.10

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed Settings for Class 1-6

Behavior		Language Arts (n = 25)		All Subjects (n = 25)	
Style	Category	Mean	Variance	Mean	Variance
A	1	—	—	—	—
	2	0.12	0.17	0.12	0.17
	3b	—	—	—	—
	9b	0.02	0.13	0.02	0.01
B	4	0.16	0.11	0.15	0.09
	5b	14.01	39.31	13.34	34.17
	7b	0.32	0.18	0.35	0.18
	8b	2.39	10.50	2.42	10.53
C	12	3.58	5.57	3.54	5.37
	13	—	—	—	—
D	6b	2.51	2.34	2.42	2.21
	11	3.75	3.10	3.68	3.24
E	6a	24.50	47.46	24.45	47.91
	7a	6.54	9.56	6.52	8.97
	9a	0.18	0.17	0.20	0.18
F	3a	0.02	0.01	0.02	0.00
	8a	0.14	0.07	0.15	0.07
G	5a	1.02	1.50	1.02	1.45
H	10	40.73	81.19	41.60	82.97
		99.99		100.00	

Table 4-11

Correlations Between Student Behavioral Styles and Selected Context Variables, Product Variables, and Percentage of Question Opportunities for Class 2-6

Variables	n^a	Styles in TD Settings									n	Styles in NTD Settings								
		A	B	C	D	E	F	G	H	OCC		A	B	C	D	E	F	G	H	OCC
CONTEXT																				
SES	20	164	-220	-015	-102	269	023	060	-095	322	25	113	-154	082	-023	232	-098	126	-098	044
IQ	19	006	498*	081	076	-057	-268	602**	-565*	-051	24	305	-163	-460*	-260	059	251	156	-411*	426*
PRODUCT: Attitudes																				
My Class Inventory	20										25									
satisfaction		-096	-026	-246	380	175	136	190	-239	218		361	147	-284	-155	-230	270	-087	-142	176
friction		099	280	-021	-333	043	-094	120	-209	001		-154	-020	200	213	232	-230	039	007	-201
competitiveness		053	273	-054	-045	-100	296	240	-201	-023		-140	-155	005	099	141	-183	107	087	-069
difficulty		530*	143	-106	004	-085	221	-158	035	-152		105	180	056	-016	698**	031	-402*	196	-163
cohesiveness		-197	-105	-240	341	-053	016	066	072	049		084	-010	-290	-427*	-068	143	284	-417*	398*
School Attitude Test	19										24									
interpersonal relations		458*	-182	-367	-045	-238	-075	015	390	025		210	215	-363	-440*	221	382	-102	-406*	372
instruction interaction		-420	-403	-056	-060	139	023	057	152	330		-173	077	146	-073	-289	077	021	-032	038
general factor		-155	-536*	-155	-187	651**	391	-244	-071	650**		-182	-104	345	226	-133	048	-292	486*	-203
Total		-186	-511*	-211	-118	233	121	-038	208	449		-110	082	101	-108	-167	187	-118	018	072
Primary Children's Scale	19										24									
anxiety in classroom		-268	288	292	383	-262	-274	378	-218	-280		038	-018	-379	-334	-122	015	411*	-481*	346
academic self-image		-056	114	032	-118	-029	-353	592**	-279	177		344	-071	-402	-180	-138	298	227	-691**	446*
PRODUCT: Achievement																				
Metropolitan Achievement Test	18										19									
Total Reading		187	631**	-288	-047	-205	-392	365	-350	-357		127	225	055	-489*	312	-016	-081	-118	029
Stanford Achievement Test	0										20									
Social Studies												071	-244	-481*	-066	226	-037	309	-321	453*
Grades: Total Language Arts	19	-063	474*	309	493*	-211	-443	511*	-339	-346	20	-164	347	-135	-480*	-308	056	289	-373	188
Total Social Studies	0										21	014	-298	-481*	-190	125	222	349	-487*	485*
Behavior	20	-125	195	216	384	094	-431	499*	-485*	037	25	-063	-285	-471*	-318	-171	337	238	-398*	557**
PERCENTAGE OF QUESTIONS ASKED	19										20									
Process Questions		-020	445	-252	-113	178	102	120	-490*	079		002	076	023	-114	094	-234	129	209	-168
Product Questions		-349	187	084	068	131	-239	365	-429	107		-241	149	-094	-172	078	-263	340	-136	076

Note. Decimal points are omitted.

[a] n = number of students whose frequency of behavior tallies is > 100.

* $p < .05$

** $p < .01$

behavior in NTD settings. Significant negative relationships exist between IQ scores and passive conforming (Style H) behaviors in both TD and NTD settings, as well as with withdrawn (Style C) behaviors in NTD settings.

With respect to attitudes measured by the MCI, students who feel that schoolwork is difficult display more aggressive (Style A) behaviors in TD settings, adult-dependent (Style E) behaviors in NTD settings, and fewer self-directed (Style G) behaviors in NTD settings. Students who feel that the class is a cohesive group show fewer peer-dependent off-task (Style D) behaviors and externally motivated (Style H) behaviors, as well as more overall coping competency in NTD settings.

Regarding the subscales of the OSAT, students who express positive attitudes about interpersonal relations exhibit more aggressive (Style A) behaviors in TD settings, and fewer Style D and Style H behaviors in NTD settings. Students who indicate more general positive attitudes toward school engage in fewer nonconforming (Style B) behaviors and more adult-dependent (Style E) and overall coping competency in TD settings, as well as display more Style H behaviors in NTD settings.

Scores on the PCAS reveal that the less anxious student engages in more self-directed (Style G) behaviors and less externally motivated (Style H) behaviors in NTD settings. And finally, students with positive academic self-images display more Style G behaviors in TD settings and higher overall coping competency.

With respect to achievement, students who attain higher MAT Total Reading scores exhibit more non-conforming (Style B) behaviors in TD settings but fewer peer-dependent, off-task (Style D) behaviors in NTD settings. Students with higher Language Arts grades also display more Style B and Style D behaviors in TD settings, but in addition are more self-directed (Style G) in TD settings and less peer-dependent, off-task (Style D) in NTD settings.

When Social Studies classes were held, the teacher had students working in pairs on reports or topics that they had chosen. Consequently, behavioral data with respect to this academic subject were obtained in NTD settings only. Students with high scores on the Social Studies subtest of the SAT and high Social Studies grades exhibit few withdrawn (Style C) behaviors and greater overall coping competency.

Students with high Behavior grades displayed more self-directed (Style G) behavior and less externally motivated (Style H) behavior in TD settings, and less withdrawn (Style C) behaviors, but less Style H behaviors, and greater overall coping competency in NTD settings.

With regard to question opportunities, fewer process questions are directed to students exhibiting externally motivated (Style H) behaviors in TD settings. No other significant relationships exist between behavioral Styles and question opportunities.

Table 4.12 shows that active off-task behaviors (Style B) occur slightly more often than passive off-task behaviors (Styles C and D) in TD settings only (7% vs. 4%). Total off-task behavior is relatively low in this class, accounting for approximately 11% to

Table 4.12

Mean Percent of Occurrence and Variance for Behavior Categories Grouped by Behavioral Styles in Teacher Directed and Non-Teacher Directed Settings for Class 2-6

Behavior Style	Category	Language Arts TD Settings (n=19) Mean	Variance	Language Arts NTD Settings (n=20) Mean	Variance	Social Studies NTD Settings (n=21) Mean	Variance	All Subjects TD Settings (n=20) Mean	Variance	All Subjects NTD Settings (n=25) Mean	Variance
A	1	—	—	—	—	—	—	—	—	—	—
	2	0.04	0.03	0.16	0.30	0.04	0.03	0.11	0.06	0.11	0.09
	3b	—	—	—	—	—	—	—	—	—	—
	9b	0.04	0.03	0.04	0.02	—	—	0.04	0.03	0.02	0.01
B	4	0.25	0.32	0.25	0.26	0.25	0.16	0.25	0.29	0.28	0.13
	5b	5.26	44.84	1.04	2.82	2.15	9.48	5.48	45.02	1.56	3.70
	7b	0.40	0.44	0.52	0.55	0.46	0.33	0.37	0.40	0.48	0.27
	8b	1.19	2.35	3.34	16.08	4.65	14.51	1.33	2.34	3.81	10.58
C	12	1.68	3.58	1.03	1.94	1.13	2.02	1.45	3.08	0.95	0.71
	13	—	—	—	—	—	—	—	—	—	—
D	6b	0.86	0.94	0.63	1.08	0.99	2.64	0.88	0.87	0.75	0.76
	11	1.94	1.96	3.61	6.10	5.88	26.97	1.77	1.36	4.72	9.86
E	6a	20.91	52.70	3.27	12.11	1.45	4.19	18.55	37.99	2.34	3.02
	7a	18.68	134.62	1.98	7.55	1.99	2.80	17.44	101.02	2.13	3.02
	9a	0.13	0.09	1.41	2.44	2.39	8.86	0.19	0.11	1.77	2.80
F	3a	0.05	0.05	—	—	0.07	0.05	0.05	0.04	0.06	0.02
	8a	0.39	0.71	9.76	170.15	6.94	27.90	0.37	0.48	8.51	66.09
G	5a	5.84	21.91	68.77	117.97	67.94	115.33	5.15	23.10	67.37	91.64
H	10	42.32	119.16	4.20	24.29	3.66	17.43	46.59	123.72	5.14	19.96
		99.98		100.01		99.99		100.02		100.00	

15% of all behaviors exhibited. Otherwise the class behavior profile is similar to those profiles previously described for classes 2-1, 1-3, and 2-3.

Summary and Discussion

The results of analysis in this section show that the relationships between students' classroom behaviors and the selected context, product and teacher process (questioning) variables are complex. To illustrate, there is not a single instance where either a particular behavioral Style or the Overall Cases Coefficient significantly relates to one of the specific variables examined for all classes. The same is true even when the Styles are grouped into off-task behaviors (Styles A to D) and on-task behaviors (Styles E to H). There are only three occasions where a specific Style is related to a particular variable within a grade level. All three of these relationships are positive and involve self-directed (Style G) behaviors with achievement variables --specifically, Language Arts and Behavior grades are positively related to Style G behaviors for grade six students in TD settings, and Metropolitan Achievement Tests Total Reading scores are positively related to Style G behaviors for grade one students in NTD settings. It is only for Language Arts grades that relationships with a particular Style or the OCC can be found for as many as three of the six classes of students. In TD settings only, Language Arts grades are positively related to Style G behaviors for class 1-1 and for both of the grade six classes, and to the OCC for one class at each of the three grade levels examined. Finally, there are several instances where the direction of the relationship between a Style and one of the other variables is reversed for two classes. For example, the relationship of MAT Total Reading scores and Language Arts grades to non-conforming (Style B) behaviors in TD settings is negative for class 1-3 but positive for class 2-6. Similarly, the relationship between SES and Style G behaviors in TD settings is positive for class 1-6 but negative for class 2-1. In NTD settings the relationship between the OSAT interpersonal relations scores and aggressive (Style A) behaviors is positive for class 1-1 but negative for class 2-3, while there is a positive relationship between MAT Total Reading scores and Style B behaviors for class 2-3 but a negative relationship for class 1-1.

It is obvious that simple generalizations about particular student behaviors in relation to the context, product, or teacher process variables examined in this study cannot be made for all students, nor can many simple statements about such relationships be made within a given grade level or instructional setting (i.e., TD or NTD). There are, however, some consistent patterns which do emerge from the significant relationships found with specific behavioral Styles as well as with the OCC. Product variables are generally positively related to self-directed (Style G) behaviors and overall coping behaviors (OCC), and negatively related to non-conforming (Style B) behaviors and withdrawn (Style C) behaviors, in both TD and NTD settings. In addition, product variables are positively related to adult-dependent (Style E) behaviors exhibited in TD settings only. All of these relationships are in the expected direction with respect to the literature reviewed in Chapter 2.

Self-directed (Style G) behaviors are predominant in NTD settings but, as might be expected, rarely occur in TD settings. Where they do occur in TD settings, such as working on an assignment while the teacher is giving a lesson or reading a story to the class, they are considered by the teacher to be appropriate for that situation. The consistent positive relationships that exist between product variables and Style G behaviors in TD settings support the argument presented in Chapter 2 that infrequent but significant behaviors should be considered separately in analyses, rather than combined with similar, more frequently occurring behaviors. An important difference is that Style G behaviors are considered to be productive, while the argument presented in Chapter 2 was based on deviant behaviors (Forness, 1973).

It is worth noting that the achievement product variables account for 36% of the 147 significant behavior relationships found, yet comprise only 17% of the total number of independent variables examined, in the analyses conducted for this section of the study. Conversely, teacher process (questioning) variables represent only 4% of the significant relationships discovered, while they contribute 12% to the pool of independent variables. Context variables account for 11% of the significant relationships and 12% of the independent variables used, while the corresponding figures for attitude variables are 49% and 59%, respectively. Thus it seems that achievement will more often predict students' classroom behaviors than will knowledge of their SES, IQ, or attitudes toward school.

Research question 1(a) addresses itself to the relationship between SES and behaviors. If, as the literature suggests, lower SES students exhibit more off-task behaviors than do higher SES students, then half of the six significant correlations found with this variable are in the opposite direction to that expected. These unexpected relationships all occur for students in class 2-1. For this class, SES generally has a negative (ns) relationship to attitude variables and teacher grades (see Table F II, Appendix F). Two classes, 1-3 and 1-6, account for the remaining SES-behavior relationships. An examination of the correlation matrices for those classes (Tables F III and F V , respectively) reveals that SES is generally negatively related to attitudes but positively related to teacher grades for class 1-3, whereas the direction of these relationships is reversed for class 1-6. All of these relationships are nonsignificant. Relationships between SES and IQ for all three classes are nonsignificant and generally positive. These findings taken together provide a tentative explanation for the unexpected direction of relationships found between SES and student behaviors in class 2-1. While it is possible that the differences found between class 2-1 and the other two classes are due to grade level differences, a more plausible explanation is that low SES students who are either happy with school _or_ who experience success in their academic work will generally display on-task behaviors. However, low SES students who are less happy with school _and_ who do not do well academically are apt to display more off-task behaviors in class.

Research question 1(b) is concerned with relationships between IQ and behaviors. The results pertaining to this question are similar in some respects to those that were discussed for SES. If, as the literature suggests, students of below average intelligence exhibit more off-task behaviors than do the more intelligent students, then four of the ten significant correlations found are in the opposite direction to that expected. Unlike the situation for SES, the unexpected relationships do not all occur within one class. The unexpected positive relationship between IQ and nonconforming (Style B) behaviors in NTD settings for class 2-1 can be explained by referring to the correlation matrix for this class (Table F II). The relationship between IQ and attitudes is generally negative in this class, significantly so for the general school factor and student-instruction interaction subscales of the OSAT (r's of -.459 and -.464, respectively; $p < .05$), while the relationship between IQ and teacher grades is nonsignificant. Taken together, these results suggest that the brighter students display nonconforming behavior in TD settings because the level of instruction is directed more toward the less capable students, and that such behaviors negatively influence the teacher's assessment of the bright students' achievement.

Four of the significant correlations between IQ and behaviors are found in class 2-6. Two of these are in the expected direction, that is, positive relationships with self-directed (Style G) behaviors in TD settings and with the OCC in NTD settings. However, IQ is negatively related to externally motivated (Style H) behaviors in both TD and NTD settings. The correlation matrix (Table F VI) for this class shows a significant negative relationship between IQ and the WSAT general school factor ($r = -.404$, $p < .05$) and negative (ns) relationships between IQ and attitudes toward school work, instruction, and the teacher. The relationships are positive for attitudes with respect to academic self-image ($r = .562$, $p < .01$) and generally positive regarding attitudes toward the class. It seems that the brighter students behave well when allowed to work on their own, but do not respond well when the teacher is instructing. This lends support to the belief that some students work best when teacher directed, while other students function best when given the opportunity to be self-directed.

It is apparent that the assumption of a direct relationship between student's IQ and classroom behaviors is an oversimplification. Since IQ and achievement are significantly positively correlated in all classes for which IQ and behaviors were related, there is some evidence that the IQ-behavior relationship is influenced by student attitudes toward school.

Research question 1(c) concerns the relationship between attitudes and behaviors. It may be inferred from the preceding discussion that an assumption about a direct relationship between attitudes and behaviors is too simplistic. This inference is supported by the fact that 31% of the 72 significant relationships found between attitudes and behaviors are in the opposite direction to that expected under the assumption of a direct relationship.

Some interesting patterns in the relationships are evident when attitudes are subdivided into broad categories, such as those concerned with students' feelings toward one another compared with those concerned with school and instruction. For purposes of discussion, the former will be referred to as social interaction and will include the interpersonal relations subscale of the School Attitude Test plus the satisfaction, friction, competitiveness, and cohesiveness subscales of the MCI. The remaining subscales in both of these instruments, plus the two subscales of the PCAS, will be grouped together and referred to as school attitudes.

When attitudes about social interaction are considered in relation to off-task behaviors there are about as many significant indirect relationships as there are direct relationships. That is, of the 13 significant correlations found between these attitudes and off-task behaviors, 7 reflect positive attitudes and 6 reflect negative attitudes. However, 10 of the 14 relationships between social interaction attitudes and on-task behaviors (including the OCC) reflect negative attitudes while only 4 reflect positive attitudes. This suggests that most elementary students who exhibit on-task behaviors are less peer-oriented and perhaps more teacher-oriented and/or achievement-motivated, as indicated by the large proportion of negative attitude-positive behavior relationships that were found.

When relationships between school attitudes and off-task behaviors are examined it is found that all of the 19 significant correlations reflect negative attitudes. It seems that those students who dislike the instructional and institutional aspects of school manifest their dissatisfaction by misbehaving in class. Similarly, 20 (77%) of the 26 significant correlations between school attitudes and on-task behaviors (including the OCC) reflect positive attitudes. Three of the negative relationships occur with the difficulty subscale of the MCI, indicating that some students who find school work difficult respond appropriately to the challenge. Taken together, these results seem to support the existence of a direct relationship between school attitudes and classroom behavior. Further, it appears that students' attitudes toward school, instruction, and teachers are more predictive of classroom behaviors than are attitudes dealing with the students' social interaction.

The relationship between student achievement and classroom behaviors is the focus of research question 1(d). It is here that the greatest stability in relationships between independent variables and classroom behaviors is found. A description of the consistent relationships found between achievement variables and both the OCC and particular behavior Styles was presented earlier in this section. Similar results are evident when on-task and off-task groups of behavior Styles are examined. To illustrate, if it is assumed that there is a direct relationship between achievement and classroom behavior, then 12 of the 16 relationships found for off-task behaviors are in the expected direction. Three of the four "unexpected" relationships are found in class 2-6. This class comprised the 20 highest achievers and the 6 lowest achievers in the school's population of grade six students as identified by the September MAT results. While their teacher considered most of these students as very bright and the class to be cohesive, it was identified by their teachers as the most difficult class in the school to handle. This is also the class identified earlier in the discussion as one having positive social attitudes, negative school attitudes, and more on-task behaviors in NTD settings. Taken together the results suggest that these students achieved well in school but were characterized by off-task behaviors related to teacher directed instructional settings.

Similar stability of achievement-behavior relationships is found with on-task behaviors, where 18 of the 21 significant correlations found are in the expected direction. Again, one of these exceptions occurred in class 2-6. The other exception occurred in class 1-1 where externally motivated (Style H) behaviors are negatively related to achievement. A possible explanation for this finding was given earlier in terms of qualitative differences in attentive behavior for this class.

One final observation to be made is that there is *some* evidence to support the claim that teachers are influenced by students' general classroom behavior when grading students' achievement. There are 21 *significant* correlations between behavior Styles and grades given for Language Arts and Social Studies, but only 16 for achievement measures obtained with standardized tests (i.e., the MAT and SAT). If it is assumed that off-task behaviors (Styles A to D) will correlate negatively with achievement, and on-task behaviors (Styles E to H plus the OCC) will correlate positively with achievement, then three "unexpected" correlations occur for both grades and standard scores, and in both cases two of the three unexpected correlations occur with off-task Styles. In both cases, eight significant correlations occur with off-task Styles. If the direction of all (98) behavior-achievement correlations for each type of achievement score is examined, 73 are in the expected direction for teacher grades while only 64 are in the expected direction for standard scores. It should be noted, however, that the teacher grades used in these analyses are a combination of grades given for both achievement and effort, rather than just for achievement alone.

Research question 1(e) concerns the relationship between students' observed classroom behaviors and teacher grades given for their working skills and participation in class. It is here that the greatest stability of relationships with behaviors occurs. Of the 81 correlations reported for Styles and behavior grades, more than 25% (i.e., 22) are significant and all but 4 are in the expected direction. Three of the four exceptions occur in NTD settings with behavior Styles which are typically considered more appropriate for TD settings (i.e., Styles E and H).

In examining the "unexpected" direction of all of the behavior Style-achievement correlations it is found that most of the exceptions occur with on-task Styles (E to H). For example, approximately 70% of the "unexpected" direction of correlations with teacher grades for achievement and behavior occur with Styles E to H (21 of 31 for achievement grades and 13 of 18 for Behavior grades), while only slightly more than half (22 of 40) occur with these Styles and standard test scores.

In TD settings, where 23 of these on-task Style exceptions occur, Style F (social, productive) behaviors account for 12 of the exceptions and Style H (passive on-task) behaviors account for another 9 exceptions. In NTD settings, where 33 such exceptions occur, Style E (adult-oriented, attentive) behaviors account for 10 of the exceptions and Style H behaviors account for 12 of the exceptions. It appears, then, that simply valuing on-task behaviors as appropriate or desirable, as has been the case in many research studies, is too simplistic an approach. These results suggest that on-task behaviors must be more carefully viewed in light of the type of instructional setting in which they occur. This suggestion is supported by the findings cited in this discussion for both teacher grades and standard test scores.

Research question 2 concerns the relationship between teacher afforded opportunities given to students to answer questions in class and student behaviors. Few significant relationships were found and there is nothing in their pattern to suggest that the teacher responds to students differentially on the basis of their classroom behavior. It appears that teachers do not use questions about the subject matter as a device to control off-task behavior. If, as the studies reviewed in Chapter 2 suggest, teachers interact more frequently with misbehaving students, the nature of the interaction is probably managerial.

DIFFERENCES BETWEEN MALES AND FEMALES IN CLASSROOM BEHAVIOR

Analysis of variance for differences between independent samples was conducted using the ANOV10 computer program. This program provided the Welch approximation of t-ratios for those variables of unequal variance. All probabilities reported in the tables which follow are for two-tailed tests of significance, and all differences whose probability of occurrence by chance is $< .05$ were considered to be statistically significant. The context variables IQ and SES were included in the analyses and no significant differences between males and females were found with respect to either of these variables. The means for behavioral Style visibility coefficients are presented in the tables which follow. A coefficient $\geqslant 1.00$ or more is considered to indicate a dominant Style. Results are presented by class, with the corresponding table numbers in parentheses.

Class 1-1 (Table 4.13)

No significant differences exist between boys and girls with respect to their classroom behaviors in either TD or NTD settings. There are no consistent differences with relationship to the frequency of on-task or off-task behaviors, nor in the variances which are significantly different for particular Styles, which would provide circumstantial evidence for sex-linked classroom behavior patterns. Visible Styles for both boys and girls are E and H in TD settings and G in NTD settings.

Table 4.13

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Males and Females in Class 1-1

Setting	Style	Males		Females		
		$\bar{X}$	SD	$\bar{X}$	SD	t
TD		(n = 11)		(n = 12)		
	A	0.18	0.33	0.04	0.07	1.46 (p=.17)[a]
	B	0.26	0.17	0.24	0.15	0.36 (p=.72)
	C	0.20	0.30	0.29	0.26	-0.82 (p=.42)
	D	0.36	0.32	0.23	0.12	1.29 (p=.22)[a]
	E	1.75	0.72	1.79	0.82	-0.11 (p=.91)
	F	0.02	0.03	0.04	0.03	-1.26 (p=.22)
	G	0.04	0.07	0.02	0.03	0.62 (p=.54)[a]
	H	1.59	0.46	1.71	0.48	-0.59 (p=.56)
	OCC	5.37	0.40	5.49	0.45	-0.71 (p=.48)
NTD		(n = 14)		(n = 13)		
	A	0.13	0.20	0.12	0.14	0.16 (p=.88)
	B	0.20	0.13	0.13	0.13	1.14 (p=.28)
	C	0.28	0.29	0.21	0.18	0.75 (p=.46)
	D	0.58	0.29	0.51	0.29	0.59 (p=.56)
	E	0.26	0.13	0.27	0.14	-0.22 (p=.82)
	F	0.18	0.10	0.23	0.10	-1.17 (p=.25)
	G	1.92	0.30	1.97	0.29	-0.41 (p=.69)
	H	0.17	0.11	0.18	0.14	-0.23 (p=.82)
	OCC	6.80	0.58	6.98	0.40	-0.92 (p=.36)

[a] t values and probabilities are adjusted for unequal variance.

Class 2-1 (Table 4.14)

Girls exhibit more withdrawn (Style C) behaviors in TD settings than do boys but the reverse situation is true in NTD settings. The mean Style C coefficient approaches visibility (0.98) for boys in TD settings. Girls display fewer non-conforming (Style B) behaviors and greater overall coping competency than do boys in NTD settings. These results suggest that NTD settings may be more appropriate than TD settings for girls in this class for on-task classroom behavior. This observation is tentatively supported by the fact that girls exhibit more (ns, $p = .07$) self-directed (Style G) behaviors than do boys in NTD settings, and such behaviors were found to be significantly related to achievement for this class in the previous analysis. As with class 1-1, visible Styles for both boys and girls are E and H in TD settings and G in NTD settings.

Class 1-3 (Table 4.15)

Significant behavioral differences between boys and girls occur in TD settings only. Boys exhibit more non-conforming, peer-oriented (Style B) behaviors than do girls. Boys attain a visible coefficient (1.00) for Style C (withdrawn) behaviors although the mean difference between boys and girls is nonsignificant ($p = .08$). Unlike the situation for the two grade one classes, Style E is not visible in TD settings for boys or girls, although it approaches diagnostic significance for girls (0.99). Style H is visible in TD settings for both boys and girls, as is Style G in NTD settings. Girls

Table 4.14

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Males and Females in Class 2-1

		Males		Females		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	t
TD		(n = 11)		(n = 10)		
	A	0.07	0.11	0.07	0.14	0.02 (p=.98)
	B	0.35	0.19	0.37	0.19	-0.19 (p=.85)
	C	0.42	0.38	0.76	0.36	-2.09 (p=.05)
	D	0.50	0.35	0.42	0.25	0.58 (p=.57)
	E	1.53	0.63	1.99	0.53	-1.80 (p=.09)
	F	0.09	0.09	0.08	0.07	0.47 (p=.65)
	G	0.03	0.03	0.03	0.04	-0.12 (p=.90)
	H	1.50	0.45	1.19	0.36	1.74 (p=.10)
	OCC	5.17	0.50	5.31	0.36	-0.75 (p=.46)
NTD		(n = 13)		(n = 15)		
	A	0.06	0.09	0.02	0.06	1.38 (p=.18)
	B	0.23	0.17	0.12	0.08	2.22 (p=.04)[a]
	C	0.98	1.07	0.12	0.14	2.86 (p=.01)[a]
	D	0.62	0.45	0.38	0.24	1.82 (p=.08)
	E	0.21	0.24	0.20	0.18	0.20 (p=.84)
	F	0.10	0.11	0.12	0.12	-0.40 (p=.69)
	G	1.19	0.50	2.19	0.36	-1.90 (p=.07)
	H	0.15	0.14	0.19	0.22	-0.62 (p=.54)
	OCC	6.48	0.98	7.18	0.47	-2.38 (p=.03)[a]

[a] t values and probabilities are adjusted for unequal variance.

Table 4.15

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Males and Females in Class 1-3

		Males		Females		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	t
TD		(n = 13)		(n = 13)		
	A	0.13	0.20	0.09	0.20	0.43 (p=.67)
	B	0.27	0.17	0.12	0.09	2.83 (p=.01)
	C	1.00	0.87	0.49	0.45	1.88 (p=.08)[a]
	D	0.48	0.25	0.44	0.30	0.32 (p=.75)
	E	0.77	0.41	0.99	0.44	-1.28 (p=.21)
	F	0.01	0.02	0.00	0.01	0.60 (p=.56)
	G	0.05	0.05	0.07	0.08	-0.95 (p=.35)
	H	2.03	0.27	2.10	0.16	-0.80 (p=.43)
	OCC	4.74	0.45	5.04	0.41	-1.82 (p=.08)
NTD		(n = 11)		(n = 10)		
	A	0.20	0.30	0.22	0.23	-0.24 (p=.81)
	B	0.15	0.14	0.12	0.09	0.65 (p=.52)
	C	0.23	0.30	0.19	0.23	0.33 (p=.74)
	D	0.33	0.30	0.39	0.32	-0.45 (p=.66)
	E	0.28	0.22	0.26	0.08	0.33 (p=.75)[a]
	F	0.88	0.37	1.06	0.28	-1.26 (p=.22)
	G	1.73	0.30	1.66	0.24	0.58 (p=.57)
	H	0.13	0.12	0.10	0.07	0.76 (p=.46)
	OCC	7.47	0.48	7.56	0.57	-0.37 (p=.72)

[a] t values and probabilities are adjusted for unequal variance.

are also characterized by social, productive (Style F) behaviors in NTD settings, although the mean difference between boys and girls with respect to these behaviors is non-significant. Students appear to work together in NTD settings more often than was the case for grade one classes.

Class 2-3 (Table 4.16)

Boys engage in more nonconforming (Style B) behaviors in both TD and NTD settings than do girls. Boys also display less overall coping competency than do girls in TD settings. Although other differences are non-significant it can be seen that the means are higher for boys on all remaining off-task Styles and lower on all on-task Styles than they are for girls in TD settings only. Style H is visible for both boys and girls in TD settings but, as with class 1-3, Style E is not visible. In NTD settings the dominant Style is G for both sexes.

Class 1-6 (Table 4.17)

Data for this class are available for TD settings only. The only significant difference between the behaviors of boys and girls occurs with Style C, where girls are more withdrawn than are boys. Visible Styles for both boys and girls are E and H.

Class 2-6 (Table 4.18)

Girls exhibit more peer-oriented, non-conforming (Style D) behaviors in TD settings than do boys, while boys exhibit more self-directed (Style G) behaviors than do girls in TD settings. There

Table 4.16

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Males and Females in Class 2-3

		Males		Females		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	t
TD		(n = 10)		(n = 18)		
	A	0.13	0.18	0.03	0.07	1.66 (p=.13)[a]
	B	0.73	0.14	0.50	0.26	3.10 (p=.00)[a]
	C	0.51	0.46	0.44	0.41	0.41 (p=.68)
	D	0.59	0.26	0.52	0.25	0.72 (p=.48)
	E	0.57	0.27	0.63	0.32	-0.49 (p=.62)
	F	0.00	0.01	0.02	0.02	-1.53 (p=.14)[a]
	G	0.06	0.05	0.09	0.10	-1.10 (p=.28)[a]
	H	1.76	0.17	1.95	0.28	-1.93 (p=.06)
	OCC	4.48	0.21	4.72	0.38	-2.22 (p=.03)[a]
NTD		(n = 11)		(n = 19)		
	A	0.12	0.17	0.13	0.18	-0.21 (p=.83)
	B	0.75	0.28	0.53	0.23	2.31 (p=.03)
	C	0.64	0.53	0.37	0.30	1.55 (p=.14)[a]
	D	0.60	0.27	0.72	0.41	-0.85 (p=.40)
	E	0.27	0.24	0.18	0.14	1.23 (p=.24)[a]
	F	0.32	0.34	0.39	0.29	-0.58 (p=.57)
	G	1.41	0.31	1.57	0.28	-1.49 (p=.15)
	H	0.15	0.11	0.12	0.10	0.59 (p=.56)
	OCC	6.04	0.82	6.34	0.62	-1.15 (p=.26)

[a] t values and probabilities are adjusted for unequal variance.

Table 4.17

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed Settings for Males and Females in Class 1-6

Setting	Style	Males (n=12) $\overline{X}$	Males (n=12) SD	Females (n=13) $\overline{X}$	Females (n=13) SD	t
TD	A	0.02	0.05	0.05	0.14	-0.70 (p=.49)[a]
	B	0.63	0.28	0.66	0.31	-0.27 (p=.79)
	C	0.49	0.28	0.91	0.53	-2.50 (p=.02)[a]
	D	0.27	0.08	0.34	0.16	-1.42 (p=.17)[a]
	E	1.59	0.30	1.53	0.47	0.42 (p=.68)
	F	0.00	0.01	0.01	0.01	-1.34 (p=.19)
	G	0.02	0.02	0.04	0.04	-1.16 (p=.26)
	H	1.45	0.33	1.32	0.28	1.03 (p=.32)
	OCC	5.09	0.22	4.94	0.47	1.02 (p=.32)

[a] t values and probabilities are adjusted for unequal variance.

Table 4.18

Means, Standard Deviations, and Probabilities of Mean Differences of Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Males and Females in Class 2-6

		Males		Females		
Setting	Style	$\bar{X}$	SD	$\bar{X}$	SD	t
TD		(*n* = 15)		(*n* = 5)		
	A	0.02	0.06	0.04	0.08	-0.37 (*p*=.72)
	B	0.35	0.32	0.14	0.13	1.40 (*p*=.18)
	C	0.24	0.35	0.43	0.38	-1.01 (*p*=.33)
	D	0.12	0.06	0.24	0.15	-2.58 (*p*=.02)
	E	1.76	0.48	2.16	0.57	-1.54 (*p*=.14)
	F	0.02	0.04	0.01	0.02	0.75 (*p*=.46)
	G	0.18	0.15	0.07	0.04	2.32 (*p*=.03)[a]
	H	1.52	0.40	1.44	0.27	0.41 (*p*=.69)
	OCC	5.62	0.31	5.65	0.37	-0.22 (*p*=.83)
NTD		(*n* = 18)		(*n* = 6)		
	A	0.04	—	—	—	—
	B	0.27	0.18	0.18	0.13	1.20 (*p*=.24)
	C	0.20	0.16	0.19	0.24	0.07 (*p*=.94)
	D	0.26	0.14	0.34	0.30	-0.88 (*p*=.39)
	E	0.32	0.15	0.26	0.13	0.81 (*p*=.42)
	F	0.42	0.37	0.46	0.60	-0.19 (*p*=.85)
	G	1.94	0.27	1.87	0.34	0.54 (*p*=.59)
	H	0.13	0.14	0.26	0.14	-1.94 (*p*=.06)
	OCC	7.26	0.48	7.20	0.64	0.24 (*p*=.81)

[a] *t* values and probabilities are adjusted for unequal variance.

are no significant differences in NTD settings, although girls display more other-directed (Style H) behaviors than do boys ($p = .06$). The visible Styles for both boys and girls are E and H in TD settings, and G in NTD settings.

Summary and Discussion

It is obvious that there are no consistent differences for all classes between behaviors of boys and girls with respect to any one Style or to the OCC, even if the class for whom no significant differences are found is excluded from consideration. The most consistent finding is that in three of the classes boys display more peer-oriented, non-conforming (Style B) behaviors than do girls. However, the mean coefficient for Style B does not attain visibility (i.e.,a coefficient of 1.00) for boys in any class. Where girls exhibit more off-task behaviors than do boys (classes 2-1, 1-6, and 2-6), the nature of the behavior is passive (Styles C and D) rather than active (Styles A and B). None of the behavioral differences found between boys and girls is specific to grade level or setting.

The results lend some support to the studies reviewed in Chapter 2 which found that when behavioral differences between boys and girls do occur, boys tend to display more active types of off-task behaviors than do girls. However, there is no evidence in the results of this study which supports the finding in other investigations that girls are more attentive to instruction than are boys.

There is substantial stability in the visibility of some Styles across all classes for both sexes. For example, Style H (other-directed, task oriented) behavior is characteristic of TD settings, while Style G (inner-directed, task oriented) behavior is dominant in NTD settings. In addition, Style E (adult-dependent, compliant, attentive) behavior is visible in grade one and grade six classes, and approaches visibility for both boys and girls in class 1-3 (coefficients of .77 and .99, respectively). Among off-task behaviors, only Style C reaches or approaches visibility. Taken together these results support those of other studies which show that most classroom behavior of students is on-task, and that when off-task behaviors do occur they are more passive than active in nature. However, the small standard deviations for the predominant Styles found in this study suggest that when students are observed late in the school year, as is the case here, their behaviors appear to most closely approximate behavioral norms fostered by the process of schooling. If this is so, then the number of significant differences and correlations found in this study may be smaller than those reported in other studies which observed students at earlier times in the school year.

BEHAVIORAL DIFFERENCES AMONG HIGH-, MIDDLE-, AND LOW-SCORING STUDENTS ON ATTITUDE AND ACHIEVEMENT MEASURES

The analyses in this section were conducted to determine if other than straight-line relationships exist between classroom behaviors and selected product variables (see research question 4). One-way analysis of variance for fixed effects and unequal group sizes was conducted using the ANOV15 program. This program provided probabilities for differences between group means using the Scheffé Test. An $\alpha = .05$ was chosen as the significance level for interpreting statistical differences reported in the following results.

It was assumed that the standards used by teachers in grading the achievement of students would vary from teacher to teacher; consequently, results are presented separately for each class when grades are used as the independent variable. For standard measures such as the MAT Total Reading Test and the attitude scales, students were grouped across all classes according to scores obtained. However, class 1-6 was excluded from consideration for NTD settings because of insufficient behavioral data.

The attitude variables chosen for investigation are the satisfaction subscale of the MCI and the student-instruction interaction subscale of the School Attitude Test. The former is concerned with the student's attitudes toward his classmates while the latter assesses the student's attitudes toward instruction and teachers. These two attitude variables are non-significantly related in all classes.

Behavioral Differences: Language Arts Grades

Class 1-1. Table 4.19 shows that there are significant differences among groups of achievers with respect to Styles E, F, and G, and the Overall Cases Coefficient (OCC) in TD settings, and Style G and the OCC in NTD settings. It has been shown previously that all of these behaviors except Style F were significantly related to achievement. An examination of the probabilities (not shown) for significant differences between groups with respect to these

Table 4.19

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Class 1-1 Students Grouped by Language Arts Grades

Setting	Style	Achievement Groups						
		High		Middle		Low		
		$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	F ratio
TD		(*n* = 5)		(*n* = 6)		(*n* = 8)		
	A	0.07	0.11	—	—	0.23	0.44	0.58 (*p*=.46)
	B	0.20	0.14	0.42	0.21	0.22	0.14	3.25 (*p*=.06)
	C	0.17	0.30	0.34	0.32	0.23	0.23	0.52 (*p*=.60)
	D	0.26	0.21	0.24	0.07	0.25	0.12	0.05 (*p*=.95)
	E	2.78	0.55	1.24	0.55	1.50	0.63	10.69 (*p*=.00)
	F	0.01	0.02	0.06	0.02	0.03	0.04	4.43 (*p*=.03)
	G	0.06	0.08	0.06	0.05	0.00	0.01	3.12 (*p*=.07)
	H	1.02	0.32	1.83	0.36	1.89	0.48	7.83 (*p*=.00)
	OCC	5.90	0.31	5.21	0.33	5.32	0.24	9.08 (*p*=.00)
NTD		(*n* = 6)		(*n* = 8)		(*n* = 13)		
	A	0.11	0.13	0.06	0.09	0.15	0.23	0.55 (*p*=.58)
	B	0.14	0.05	0.13	0.14	0.23	0.17	1.53 (*p*=.24)
	C	0.27	0.25	0.22	0.12	0.28	0.31	0.15 (*p*=.86)
	D	0.44	0.26	0.46	0.21	0.70	0.31	2.94 (*p*=.07)
	E	0.24	0.11	0.18	0.05	0.31	0.15	2.89 (*p*=.08)
	F	0.20	0.11	0.17	0.10	0.16	0.10	0.44 (*p*=.65)
	G	2.11	0.19	2.11	0.17	1.77	0.34	5.10 (*p*=.01)
	H	0.10	0.08	0.18	0.07	0.23	0.17	1.75 (*p*=.20)
	OCC	7.12	0.36	7.08	0.29	6.54	0.56	5.09 (*p*=.01)

achievement-related behaviors reveals that such differences occurred only for the visible Styles and the OCC. These differences are in the expected direction but the relationship between the high, middle, and low groups changes across instructional settings. To illustrate, the middle and low achievers exhibit similar behaviors in TD settings (Styles E and H, and the OCC), and significant differences then occur between high achievers and each of the middle and low groups. High achievers exhibit more adult-dependent (Style E) behaviors and overall coping competency than do low achievers and both of these types of behaviors were previously found to be positively related to achievement. The behavior-achievement relationship for both Style E and the OCC, therefore, is approximately J-shaped (i.e., ╱). For other-directed, task oriented (Style H) behaviors, which were previously found to be negatively related to achievement, the distribution approximates an inverted L (i.e., ╲).

With respect to visible self-directed (Style G) behaviors and overall coping behaviors (OCC) in NTD settings, the high and middle achievers are similar. High and middle achievers exhibit more Style G and OCC behaviors than do low achievers in NTD settings. The distribution of these behavior-achievement relationships approximates an inverted J (i.e., ╭). This suggests three things. First, high achievers are characterized by more on-task and fewer off-task behaviors than are low achievers. Second, the average achievers have more difficulty coping with teacher-directed instruction since it is here that their behaviors are more like those of low achievers. Third, the behavior-achievement relationship with respect to dominant

Styles appears to be curvilinear, not simply linear.

Table 4.20 shows that high and low achieving students generally differ with respect to negative and positive behaviors, although Styles F and G are practically nonexistent in TD settings. Also, all students exhibiting visible negative achievement-related Styles A to D are low achievers (i.e., students 9, 11, and 17). However, the distinction between high and low achieving students cannot be simply made with respect to positive and negative behaviors. For example, the behavior profile of student 7 in the low group is similar to that of student 1 in the high group. Both are females of average intelligence and SES background. The low achiever shows slightly more on-task behaviors and slightly fewer off-task behaviors than does the high achiever. In this instance sex, IQ, and SES are better predictors of behaviors than is achievement. Other comparisons made within achievement groups show the unimportance of differences in sex (e.g., students 1 and 3), SES (e.g., students 3 and 5) or IQ (e.g., students 15 and 19) in predicting behaviors. The point is that, while relationships found by using group statistical procedures can provide general guidelines for instruction, the teacher who is concerned with meeting the individual needs of students should observe such guidelines with caution.

Class 2-1. Table 4.21 shows that the only difference among achievement groups occurs with Style B in TD settings. No significant relationships were found earlier between behaviors and achievement. An examination of differences between groups reveals that low achievers exhibit significantly more peer-oriented, nonconforming

Table 4.20

Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 1-1

					Styles in Teacher Directed Settings								Styles in Non-Teacher Directed Settings							
	Sex	SES	IQ	LA Grade	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H
1	F	34.77	93	34.0	0.24	0.08	—	0.14	2.64	—	0.08	1.29	0.22	0.07	0.62	0.24	0.29	0.11	2.30	0.03
2	F	68.32	135	33.0	0.12	0.21	—	0.15	3.68	0.02	—	0.57	0.27	0.15	0.11	0.38	0.24	0.35	1.95	0.23
3	M	30.74	110	32.0	—	0.10	0.17	0.17	2.26	—	0.20	1.36	—	0.13	0.28	0.30	0.14	0.19	2.24	0.14
4	M	52.11	106	32.0									—	0.16	—	0.56	0.12	0.21	2.20	0.04
5	M	75.16	98	30.0	—	0.42	—	0.62	2.45	0.05	—	0.90	—	0.12	0.53	0.90	0.42	0.07	1.80	0.12
6	M	49.21	107	30.0	—	0.17	0.68	0.21	2.86	—	0.02	1.00	0.19	0.23	0.08	0.23	0.25	0.30	2.15	0.08
	$\bar{X}$	51.72	108.2	31.8																
		(51.64)	(108.6)	(31.8)																
7	F	46.95	98	24.0	—	0.19	0.19	0.39	2.86	—	—	0.97	—	—	—	0.19	0.19	0.04	2.47	0.17
8	F	27.25	93	24.0	—	0.39	0.56	0.14	1.53	0.03	—	1.78	—	0.25	0.14	0.69	0.52	0.03	1.42	0.62
9	M	30.74	129	24.0	1.14	0.40	—	0.30	1.60	0.04	—	1.55	0.27	0.14	0.22	0.45	0.38	0.11	1.96	0.23
10	F	40.68	96	24.0									—	0.19	0.30	0.84	0.49	0.15	1.71	0.14
11	F	33.49	93	24.0	—	0.05	0.54	0.10	1.11	0.10	0.19	2.30	—	—	0.54	1.24	0.24	0.08	1.82	0.07
12	F	33.49	100	24.0	—	0.36	0.18	0.41	1.45	—	—	1.76	0.34	0.36	0.09	0.29	0.25	0.18	2.03	0.12
13	M	54.75	135	24.0									—	0.20	0.18	0.59	0.32	0.15	2.01	0.08
14	M	64.78	143	24.0	0.66	0.14	0.00	0.31	0.66	—	—	2.48	0.10	0.40	0.08	0.52	0.40	0.04	1.67	0.38
15	M	32.11	96	24.0									0.14	0.28	0.12	0.75	0.55	0.23	1.40	0.40
16	M	74.34	117	24.0	—	0.12	0.37	0.12	1.43	0.06	—	2.09	0.25	0.14	0.30	0.82	0.35	0.22	1.78	0.13
17	M	29.51	90	21.0									0.81	0.52	1.19	1.22	0.11	0.19	1.33	0.04
18	F	55.19	105	20.0	—	0.14	—	0.22	1.32	0.04	—	2.16	—	0.05	0.12	0.71	0.06	0.22	2.09	0.16
19	M	48.74	129	16.0									—	0.47	0.39	0.81	0.23	0.39	1.32	0.39
	$\bar{X}$	45.54	109.5	22.8																
		(45.78)	(109.8)	(23.5)																

__Note__. Mean values in parentheses pertain to the students for whom Styles are available in teacher directed settings.

Table 4.21

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Class 2-1 Students Grouped by Language Arts Grades

		Achievement Groups						
		High		Middle		Low		
Setting	Style	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	F ratio
TD		(n = 7)		(n = 7)		(n = 7)		
	A	0.11	0.15	0.09	0.12	0.08	0.21	0.06 (p=.94)
	B	0.43	0.17	0.17	0.16	0.46	0.24	4.84 (p=.02)
	C	0.65	0.49	0.63	0.46	0.66	0.58	0.01 (p=.99)
	D	0.40	0.21	0.49	0.35	0.55	0.34	0.45 (p=.64)
	E	1.83	0.79	1.50	0.62	1.61	0.52	0.46 (p=.64)
	F	0.10	0.09	0.12	0.12	0.07	0.10	0.41 (p=.67)
	G	0.05	0.06	0.03	0.01	0.02	0.03	0.75 (p=.49)
	H	1.24	0.52	1.62	0.56	1.31	0.41	1.11 (p=.35)
	OCC	5.30	0.38	5.24	0.21	5.05	0.61	0.64 (p=.54)
NTD		(n = 7)		(n = 7)		(n = 5)		
	A	0.21	0.20	0.21	0.35	0.21	0.37	0.00 (p=1.00)
	B	0.10	0.08	0.12	0.11	0.23	0.20	1.64 (p=.22)
	C	0.07	0.10	0.13	0.16	0.38	0.42	2.58 (p=.11)
	D	0.29	0.18	0.28	0.25	0.40	0.42	0.33 (p=.72)
	E	0.25	0.08	0.31	0.28	0.22	0.16	0.35 (p=.71)
	F	1.15	0.20	0.78	0.44	1.08	0.33	2.21 (p=.14)
	G	1.72	0.28	1.86	0.25	1.51	0.37	2.09 (p=.16)
	H	0.08	0.05	0.09	0.11	0.15	0.15	0.71 (p=.50)
	OCC	7.81	0.39	7.60	0.33	7.31	0.66	1.75 (p=.21)

behaviors than do average achievers ($p = .04$, two-tailed test). Although high achievers also exhibit more Style B behavior than middle achievers, the difference between the two groups is non-significant ($p = .06$, two-tailed test). The achievement-behavior relationship for Style B is approximately V-shaped.

As expected from the preceding discussion, Table 4.22 reveals that there is little distinction between the behaviors of high and low achievers. In TD settings six of the seven low achievers show dominant externally motivated, task-oriented (Style H) behaviors, as compared with four of the seven high achievers. Style H was found earlier to be negatively correlated (ns) with achievement. Style G is practically nonexistent for all students, but the student exhibiting most of this behavior is a low achiever (student 13). Style F behavior also rarely occurs. In NTD settings only one student, a low achiever, is characterized by off-task, peer-dependent (Style D) behaviors. It may be, as other studies have found, that achievement in Language Arts is related to sex differences at the elementary school level. Only one male appears in the high achieving group and only two females are in the low achieving group. If such a sex-linked difference exists in this class, there is nothing in these data which can provide an explanation for the nature of such differences.

Class 1-3. The behavioral data for NTD settings were excluded from this analysis since only 7 students satisfied the criterion of 100 or more tallies for observation. Table 4.23 shows that significant differences occur among achievement groups with

Table 4.22

Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 2-1

					Styles in Teacher Directed Settings								Styles in Non-Teacher Directed Settings							
	Sex	SES	IQ	LA Grade	A	B	C	D	E	F	G	H	A	B	C	D	E	F	G	H
1	F	37.14	135	44.0	—	0.43	1.07	0.23	2.60	—	0.11	0.79	0.15	0.12	—	0.27	0.18	0.71	2.04	0.06
2	F	45.68	100	40.0	—	0.70	1.46	0.47	1.28	0.22	—	1.19	—	0.02	0.11	0.24	0.13	1.15	1.94	0.02
3	F	29.18	131	37.0	0.21	0.40	0.33	0.83	2.33	0.08	0.07	0.67	0.32	0.08	—	0.19	0.30	1.18	1.69	0.14
4	F	37.79	114	36.0	—	0.20	0.17	0.30	2.95	0.04	0.02	0.91	—	0.08	0.10	0.17	0.29	1.23	1.72	0.13
5	F	45.99	129	34.0	—	0.48	0.90	0.34	1.46	0.22	—	1.44	0.57	0.27	0.27	0.66	0.36	1.19	1.21	0.09
6	M	58.17	125	33.0	0.37	0.27	0.30	0.34	0.86	0.04	—	2.19	0.14	0.07	—	0.37	0.29	1.37	1.53	0.11
7	F	35.80	89	31.0	0.19	0.55	0.31	0.27	1.35	0.08	0.15	1.49	0.31	0.02	—	0.12	0.21	1.23	1.88	0.04
	$\bar{X}$	41.39	117.6	36.4																
8	M	52.68	131	25.5	—	0.38	—	0.15	2.28	0.04	—	1.37	0.86	0.57	0.11	0.11	0.17	1.49	1.25	0.08
9	M	53.85	118	25.0	—	0.76	1.21	0.86	0.82	—	0.05	1.32	—	0.12	0.92	1.07	0.14	0.87	1.12	0.38
10	M	29.71	93	25.0	—	0.20	0.13	0.09	1.46	0.09	0.05	1.98	—	0.10	0.12	0.03	0.15	0.85	2.00	0.20
11	M	54.54	127	25.0	—	0.12	—	0.38	1.73	0.30	—	1.63	0.17	0.27	—	0.54	0.14	0.81	1.80	—
12	F	33.49	95	24.8	0.56	0.51	1.05	0.64	2.18	0.04	—	0.75								
13	M	30.03	102	24.0	—	0.73	1.04	0.91	1.22	—	0.74	1.04	—	0.10	0.71	0.27	0.51	1.40	1.36	0.10
14	F	45.19	91	22.4	—	0.51	1.20	0.83	1.58	0.04	—	1.08								
	$\bar{X}$	42.78	108.1	24.5																
		(44.16)	(114.2)	(24.9)																

Note. Mean values in parentheses pertain to the five students for whom Styles are available in non-teacher directed settings.

Table 4.23

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Teacher Directed Settings for Class 1-3 Students Grouped by Language Arts Grades

		Achievement Groups						
		High (n=7)		Middle (n=7)		Low (n=5)		
Setting	Style	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	F ratio
TD	A	0.13	0.18	0.20	0.36	0.16	0.06	0.18 (p=.68)
	B	0.09	0.09	0.10	0.06	0.36	0.23	7.52 (p=.00)
	C	0.22	0.24	0.56	0.59	0.99	0.48	4.09 (p=.04)
	D	0.31	0.19	0.54	0.36	0.58	0.29	1.64 (p=.22)
	E	1.09	0.46	0.98	0.49	0.91	0.46	0.23 (p=.80)
	F	0.01	0.00	0.01	0.00	0.01	0.00	0.07 (p=.79)
	G	0.07	0.06	0.06	0.11	0.00	0.01	1.06 (p=.37)
	H	2.21	0.21	2.05	0.21	1.83	0.30	3.67 (p=.05)
	OCC	5.23	0.20	4.98	0.51	4.64	0.40	3.29 (p=.06)

respect to the OCC and to Styles B, C, and H. The OCC was found to be positively related to achievement while Styles B and C were negatively related to achievement. The relationship between Language Arts grades and Style H behavior was non-significantly positive (r = .382). Examination of group differences shows that the differences for Styles C and H were in the expected direction for high and low achieving groups (p = .02 in both cases, one-tailed test). Although there were no significant differences involving the middle group with reference to these two Styles, mean values lie between those of the high and low achievers. This suggests that the behavior-achievement relationship for Styles C and H is simply linear. Both high and middle achievers exhibit significantly fewer Style B behaviors than do low achievers (p = .01 and p = .03, respectively; one-tailed tests). This suggests that the behavior-achievement relationship is approximately L-shaped (i.e., ╲_) for Style B behaviors.

It can be seen from Table 4.24 that the predominant behavioral characteristic of low achievers is their avoidance of tasks. Three of the five low achievers show visible Style C behaviors. As well, IQ differences also appear to be a strong contributing factor to achievement differences. It was found that high achievers have a significantly higher mean IQ when compared with low achievers (p = .00). Again, Style F is essentially non-existent and, although Style G is also rare, it is exhibited by five of the seven high achievers.

Class 2-3. The behavioral data presented in Tables 4.25 and 4.26 are for NTD settings only. There were insufficient data on students in TD settings for this analysis. Table 4.25 shows that

Table 4.24

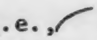
Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 1-3

					Styles in Teacher Directed Settings							
	Sex	SES	IQ	LA Grade	A	B	C	D	E	F	G	H
1	F	70.14	142	40.0	—	0.19	—	0.14	1.74	—	—	1.92
2	F	35.80	124	38.5	—	—	0.62	0.12	1.39	—	0.05	2.16
3	F	73.22	121	38.0	—	—	0.42	0.63	0.91	—	0.12	2.10
4	M	70.14	121	38.0	—	0.08	—	0.49	0.46	—	0.12	2.49
5	F	44.32	119	36.0	—	—	0.19	0.39	1.50	—	—	2.04
6	M	40.68	118	35.0	—	0.16	0.32	0.20	0.81	—	0.05	2.41
7	F	61.96	120	35.0	—	0.19	—	0.20	0.84	—	0.13	2.33
	$\bar{X}$	56.61	123.6	37.2								
8	F	54.06	96	27.5	0.82	0.36	0.33	0.37	1.52	—	0.02	1.58
9	M	57.82	104	25.0	—	0.60	1.40	0.95	0.65	—	—	1.53
10	F	33.80	97	24.0	—	0.06	1.26	0.83	0.32	0.04	—	2.28
11	M	27.17	113	23.0	—	0.58	0.64	0.28	1.12	—	—	1.81
12	M	34.77	73	19.0	0.17	0.21	1.33	0.50	0.97	—	—	1.93
	$\bar{X}$	41.52	96.6	23.7								

Table 4.25

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Non-Teacher Directed Settings for Class 2-3 Students Grouped by Language Arts Grades

Setting	Style	Achievement Groups High (n=5) $\overline{X}$	SD	Middle (n=5) $\overline{X}$	SD	Low (n=3) $\overline{X}$	SD	F ratio
NTD	A	0.04	0.09	0.04	0.10	0.07	0.12	0.10 (p=.91)
	B	0.79	0.21	0.36	0.22	0.96	0.14	9.77 (p=.00)
	C	0.53	0.50	0.20	0.08	0.75	0.66	1.64 (p=.24)
	D	0.73	0.28	0.73	0.34	1.04	0.41	1.03 (p=.39)
	E	0.13	0.12	0.18	0.13	0.24	0.27	0.45 (p=.65)
	F	0.20	0.11	0.29	0.28	0.14	0.13	0.52 (p=.61)
	G	1.52	0.15	1.76	0.20	1.11	0.21	11.87 (p=.00)
	H	0.09	0.10	0.14	0.19	0.15	0.12	0.20 (p=.82)
	OCC	5.91	0.28	6.55	0.56	5.14	0.35	10.29 (p=.00)

significant differences occur among groups for Styles B and G as well as with the OCC. It was found earlier that no significant relationships existed between Language Arts grades and any of the indices of behavior, although the correlation coefficients were highest for Style G ($r = .316$) and the OCC ($r = .294$). Examination of mean differences between groups revealed that both high and low groups exhibit more peer-oriented, off-task (Style B) behaviors ($p = .02$ and $p = .01$, respectively; two-tailed tests). However, the high and middle groups display more appropriate, self-directed (Style G) behaviors than do low achievers ($p = .03$ and $p = .00$, respectively), and the same is true with respect to the OCC ($p = .04$ and $p = .00$, respectively; one-tailed tests). The behavior-achievement relationship for Style B appears to be V-shaped, while the relationship for Style G and the OCC approximates an inverted J (i.e., ). Low achievers are characterized by off-task Style B behaviors and low self-directed (Style G) and less overall coping competency. High achievers, although self-directed and generally on-task, seem to be able to engage in off-task behaviors with their peers with no detrimental effect on their learning.

Individual student profiles presented in Table 4.26 provide additional information on the behavioral differences between high and low achievers. Three of the five high achievers show *one* dominant off-task Style (i.e., Styles C for student 3, D for student 4, and B for student 5) whereas two of the three low achievers are characterized by *two* off-task Styles (i.e., Styles C and D for student 6, and B and C for student 7). The third low achiever has the highest

Table 4.26

Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 2-3

	Sex	SES	IQ	LA Grade	Styles in Non-Teacher Directed Settings							
					A	B	C	D	E	F	G	H
1	F	74.27	120	44.0	—	0.94	0.39	0.44	0.29	0.24	1.54	0.03
2	F	37.14	101	41.0	—	0.73	0.17	0.67	0.04	0.25	1.71	0.06
3	F	34.63	113	40.0	—	0.79	1.38	0.78	0.22	0.34	1.30	0.03
4	F	74.52	108	38.0	—	0.46	0.57	1.19	0.05	0.10	1.60	0.10
5	M	76.01	143	38.0	0.20	1.01	0.16	0.59	0.04	0.08	1.46	0.26
	$\bar{X}$	59.31	117.0	40.2								
6	M	35.80	119	34.0	0.21	0.93	1.00	1.21	0.54	—	0.88	0.17
7	M	40.68	115	32.0	—	1.11	1.25	0.58	0.13	0.18	1.15	0.27
8	F	37.14	109	32.0	—	0.84	—	1.34	0.04	0.25	1.30	0.03
	$\bar{X}$	37.87	114.3	32.7								

visibility coefficient for peer-dependent, off-task (Style D) behaviors. It seems that differences between high and low achievers are reflected by the greater number and/or degree to which off-task behavioral Styles occur among low achievers, rather than to low levels in negative behaviors for high achievers.

Class 1-6. Sufficient behavioral data were available for analysis in TD settings only. Table 4.27 reveals that significant differences occur among achievement groups for Styles F and G as well as with the OCC. All of these behaviors were previously found to be significantly positively related to achievement. Style F (social, productive) behaviors are nonexistent for low achievers and negligible for both remaining achievement groups. The significant difference found for this Style is probably a statistical artifact. High achievers exhibit significantly more self-productive (Style G) behaviors than do middle and low achievers (p = .04 and p = .02, respectively; one-tailed tests). The achievement-behavior distribution for this Style is approximately J-shaped (i.e.,). The only difference with respect to overall coping behavior occurs between high and low achievers (p = .04, one-tailed test).

Table 4.28 shows that there are few behavioral differences which distinguish high from low achievers. The positively related Styles F and G are practically nonexistent for all students. Only one student shows visible off-task behaviors, a low achiever with dominant Style B (non-conforming, peer-oriented) behaviors and Style C (withdrawn) behaviors. The most characteristic difference between the two groups of students is that all high achievers are females and all

Table 4.27

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Teacher Directed Settings for Class 1-6 Students Grouped by Language Arts Grades

		Achievement Groups						
		High (n=4)		Middle (n=16)		Low (n=5)		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	F ratio
TD	A							—
	B	0.55	0.23	0.76	0.28	0.51	0.35	1.89 (p=.18)
	C	0.43	0.24	0.83	0.54	0.59	0.31	1.37 (p=.28)
	D	0.24	0.22	0.33	0.12	0.32	0.07	0.67 (p=.52)
	E	1.91	0.66	1.51	0.31	1.44	0.27	2.24 (p=.13)
	F	0.02	0.02	0.01	0.01	—	—	4.29 (p=.05)
	G	0.07	0.04	0.03	0.03	0.01	0.01	4.43 (p=.02)
	H	1.27	0.21	1.29	0.26	1.63	0.40	2.88 (p=.07)
	OCC	5.36	0.50	4.89	0.35	5.02	0.20	2.74 (p=.09)

Table 4.28

Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 1-6

					Styles in Teacher Directed Settings							
	Sex	SES	IQ	LA Grade	A	B	C	D	E	F	G	H
1	F	30.52	116	48.0	—	0.35	0.40	0.14	2.69	0.02	0.10	0.96
2	F	74.34	105	48.0	—	0.42	0.26	—	2.23	0.04	0.02	1.40
3	F	45.05	116	46.0	—	0.55	0.78	0.49	1.15	0.02	0.10	1.32
4	F	29.71	118	44.0	—	0.87	0.27	0.34	1.30	—	0.05	1.41
	$\bar{X}$	44.90	113.8	46.5								
5	F	74.27	101	24.0	—	0.45	0.75	0.41	1.49	—	0.01	1.55
6	M	31.86	95	24.0	—	0.16	0.34	0.31	1.26	—	—	2.10
7	M	65.78	108	23.0	—	0.27	0.53	0.34	1.16	—	0.03	1.98
8	M	28.22	109	23.0	—	1.07	1.04	0.22	1.41	—	—	1.18
9	M	29.71	88	21.0	—	0.59	0.29	0.31	1.87	—	—	1.34
	$\bar{X}$	45.97	100.2	23.0								

but one low achiever are males. Again, it may be that a sex-linked difference exists with respect to Language Arts achievement.

Class 2-6. Table 4.29 reveals that the only significant difference among achievement groups is with respect to Style G behavior in TD settings. Here, high achievers were found to exhibit more of these positive achievement related behaviors than did low achievers ($\underline{p} = .03$, one-tailed test). There is an IQ factor operating with achievement differences, however, and in an expected linear direction. High achievers were found to have significantly higher IQ scores than both middle and low achievers ($\underline{p} = .02$ and $\underline{p} \leq .00$, respectively; one-tailed tests) and in turn, middle achievers were higher than low achievers ($\underline{p} = .00$, one-tailed test). This is reflected in Table 4.30, where all high achievers have consistently higher IQ scores than do low achievers. Moreover, the only student who is visibly off-task (student 4 with Style B) is a high achiever with an IQ of 135. Finally, Style F is nonexistent for all but one student, and Style G, although rare, is exhibited by all of the high achievers.

Behavioral Differences: MAT Total Reading Scores

Students were grouped across all classes according to stanine levels attained on the Total Reading subscale of the MAT administered in June, 1976. The distribution of scores is negatively skewed, as indicated by the uneven group sizes shown in Table 4.31. Significant behavioral differences among groups occur for the OCC in both settings and for Styles B, C, and G in TD settings, and A

Table 4.29

Means, Standard Deviations, and Probabilities of Overall Mean Differences in Behavior Styles in Teacher Directed and Non-Teacher Directed Settings for Class 2-6 Students Grouped by Language Arts Grades

		Achievement Groups						
		High		Middle		Low		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	F ratio
TD		(*n* = 4)		(*n* = 11)		(*n* = 3)		
	A	—	—	—	—	—	—	—
	B	0.56	0.52	0.23	0.15	0.11	0.07	3.07 (*p*=.08)
	C	0.37	0.27	0.40	0.45	0.07	0.11	0.86 (*p*=.44)
	D	0.23	0.14	0.11	0.06	0.12	0.11	2.65 (*p*=.10)
	E	1.82	0.51	1.92	0.67	2.47	0.64	1.07 (*p*=.37)
	F	—	—	0.02	0.03	0.05	0.09	0.96 (*p*=.35)
	G	0.25	0.17	0.18	0.11	0.01	0.01	3.72 (*p*=.02)
	H	1.15	0.44	1.49	0.33	1.46	0.43	1.31 (*p*=.30)
	OCC	5.50	0.53	5.72	0.29	5.90	0.37	1.12 (*p*=.35)
NTD		(*n* = 4)		(*n* = 14)				t
	A	—	—	0.07	—			—
	B	0.35	0.20	0.17	0.18			1.66 (*p*=.12)
	C	0.10	0.19	0.25	0.31			-0.96 (*p*=.35)
	D	0.11	0.08	0.23	0.15			-1.57 (*p*=.14)
	E	0.12	0.03	0.39	0.33			-1.58 (*p*=.13)
	F	0.47	0.63	0.53	0.71			-0.14 (*p*=.89)
	G	2.07	0.35	1.95	0.32			0.66 (*p*=.52)
	H	0.14	0.18	0.10	0.08			0.70 (*p*=.49)
	OCC	7.44	0.43	7.45	0.65			-0.05 (*p*=.96)

Note. There is not a low group for non-teacher directed settings because of insufficient observations for the lowest achievers.

Table 4.30

Selected Characteristics and Behavior Style Visibility Coefficients of High and Low Language Arts Achievers in Class 2-6

					Styles in Teacher Directed Settings							
	Sex	SES	IQ	LA Grade	A	B	C	D	E	F	G	H
1	M	41.43	128	48.0	—	0.42	0.52	0.22	2.22	—	0.17	1.07
2	F	45.00	113	48.0	—	0.31	0.62	0.43	1.24	—	0.07	1.78
3	M	74.27	138	48.0	—	0.19	—	0.19	2.28	—	0.47	0.97
4	M	34.38	135	46.0	—	1.32	0.33	0.08	1.53	—	0.28	0.77
	$\bar{X}$	48.77	128.5	47.5								
5	M	41.43	93	22.0	—	0.12	—	0.09	2.92	—	—	1.22
6	M	29.31	73	21.0	—	0.04	0.20	0.25	1.73	—	—	1.95
7	M	45.01	90	21.0	—	0.18	—	0.03	2.75	0.16	0.02	1.20
	$\bar{X}$	38.58	85.3	21.3								

Table 4.31

Means, Standard Deviations, and Probabilities of Overall Mean Differences of Behavioral Style Coefficients in Teacher Directed and Non-Teacher Directed Settings for the Total Student Sample Grouped by Achievement on the Total Reading Subtest of the Metropolitan Achievement Tests

		Total Reading Stanine Levels						
		9,8,7		6,5,4		3,2,1		
Setting	Style	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	F ratio
TD		(*n* = 63)		(*n* = 44)		(*n* = 7)		
	A	0.04	0.12	0.09	0.23	0.10	0.21	1.10 (*p*=.34)
	B	0.32	0.26	0.46	0.32	0.54	0.37	3.88 (*p*=.02)
	C	0.41	0.41	0.58	0.52	1.01	0.60	6.03 (*p*=.00)
	D	0.34	0.24	0.36	0.28	0.54	0.25	2.07 (*p*=.13)
	E	1.54	0.74	1.41	0.68	1.44	0.59	0.44 (*p*=.64)
	F	0.04	0.07	0.12	0.04	0.23	0.02	2.22 (*p*=.11)
	G	0.08	0.10	0.04	0.07	0.01	0.01	3.58 (*p*=.03)
	H	1.62	0.51	1.60	0.40	1.36	0.54	0.95 (*p*=.39)
	OCC	5.30	0.43	5.06	0.54	4.80	0.42	5.31 (*p*=.01)
NTD		(*n* = 62)		(*n* = 21)		(*n* = 2)		
	A	0.11	0.20	0.05	0.09	0.40	0.57	3.40 (*p*=.04)
	B	0.24	0.26	0.31	0.26	0.31	0.29	0.60 (*p*=.55)
	C	0.26	0.31	0.35	0.70	0.59	0.84	0.76 (*p*=.47)
	D	0.44	0.33	0.60	0.41	0.98	0.34	3.37 (*p*=.04)
	E	0.26	0.21	0.22	0.17	0.12	0.02	0.76 (*p*=.47)
	F	0.46	0.50	0.33	0.49	0.14	0.07	0.91 (*p*=.41)
	G	1.85	0.35	1.74	0.40	1.67	0.49	0.88 (*p*=.42)
	H	0.14	0.12	0.22	0.22	0.14	0.15	2.37 (*p*=.10)
	OCC	7.07	0.73	6.66	1.04	6.07	0.99	3.10 (*p*=.05)

and D in NTD settings. However, the probabilities for Styles A and G are somewhat larger than shown because of unequal variances between groups. In reviewing the previous correlation tables for each class, Styles B, C, and D were generally positively correlated with Total Reading scores, while Style A and the OCC generally showed a negative relationship to the MAT scores.

Probabilities of differences between group means for NTD behaviors revealed that no significant differences occurred for Style D or the OCC, but that low achievers exhibited significantly more aggressive (Style A) behaviors than did middle achievers (p=.02, one-tailed test). For TD settings, no significant differences were found between groups for self-directed, on-task (Style G) behaviors. Middle achievers exhibited more peer-oriented, non-conforming (Style B) behaviors than did high achievers (p=.03, one-tailed test). Low achievers were significantly higher than middle and high achievers with respect to withdrawn (Style C) behaviors (p=.04 and p=.00, respectively), indicating that this behavior-achievement relationship is approximately L-shaped (_). For the Overall Cases Coefficient the high achievers were significantly higher than the middle and low groups (p=.02 in both cases, one-tailed test). The OCC-achievement distribution is roughly J-shaped (_/). It appears that the middle achievers with respect to Total Reading achievement are generally successful (relatively high OCC) in coping with NTD instructional settings but are more avoidant and withdrawn than high achievers in TD settings. It should be noted, however, that significant differences with respect to low achievers should be viewed with caution because of the small number of students upon which these findings are based.

Behavior Differences: MCI Satisfaction

All students were grouped according to scores attained on the MCI satisfaction subscale. A total of 10 scores are possible, ranging from 9 to 27 in increasing units of two. Because the distribution of scores was markedly skewed in a negative direction, those students scoring from 9 to 17 were grouped together to represent students "least satisfied" with their class. The "most satisfied" group comprised students who scored 25 or 27. The remaining students made up the middle or "moderately satisfied" group.

Table 4.32 shows that significant overall differences for behaviors occurred in NTD settings only, and these were with Styles B, C, E, and F. The probability shown for Style C is somewhat higher than reported because of heterogeneity of variance. Style F was consistently positively (ns) correlated with MCI satisfaction scores, while the direction of the relationship with Style E was negative in four of the five classes. Relationships involving Styles B and C showed no stable patterns. Probabilities for mean differences revealed that the highly satisfied students exhibit more peer-oriented, non-conforming (Style B) behaviors than do the moderately satisfied students ($p = .01$, two-tailed test). The least satisfied students are more withdrawn (Style C) than the moderately satisfied students ($p = .05$, two-tailed test), and more adult-dependent (Style E) than are the most satisfied students ($p = .02$, one-tailed test). Finally, both the highly satisfied and moderately satisfied students exhibit more social on-task (Style F) behaviors than do the least satisfied students ($p = .01$ in both cases, one-tailed tests).

Table 4.32

Means, Standard Deviations, and Probabilities of Overall Mean Differences of Behavioral Style Coefficients in Teacher Directed and Non-Teacher Directed Settings for the Total Student Sample Grouped by My Class Inventory "Satisfaction" Scores

		"Satisfaction" Score Levels						
		High		Middle		Low		
Setting	Style	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	F ratio
TD		(*n* = 46)		(*n* = 72)		(*n* = 25)		
	A	0.07	0.12	0.07	0.16	0.09	0.19	0.18 (*p*=.84)
	B	0.41	0.28	0.39	0.30	0.40	0.24	0.05 (*p*=.95)
	C	0.56	0.55	0.44	0.40	0.65	0.63	1.98 (*p*=.14)
	D	0.42	0.27	0.37	0.28	0.34	0.20	0.82 (*p*=.44)
	E	1.21	0.73	1.44	0.72	1.36	0.58	1.50 (*p*=.23)
	F	0.03	0.05	0.03	0.05	0.01	0.02	1.72 (*p*=.18)
	G	0.07	0.10	0.06	0.08	0.06	0.08	0.53 (*p*=.59)
	H	1.71	0.39	1.62	0.48	1.68	0.37	0.52 (*p*=.59)
	OCC	5.03	0.58	5.16	0.48	5.07	0.46	0.93 (*p*=.40)
NTD		(*n* = 48)		(*n* = 66)		(*n* = 16)		
	A	0.12	0.18	0.09	0.18	0.09	0.11	0.33 (*p*=.72)
	B	0.36	0.30	0.22	0.22	0.29	0.19	4.70 (*p*=.01)
	C	0.38	0.61	0.25	0.26	0.58	0.68	3.40 (*p*=.04)
	D	0.50	0.30	0.47	0.37	0.49	0.34	0.08 (*p*=.92)
	E	0.21	0.16	0.26	0.17	0.33	0.20	3.29 (*p*=.04)
	F	0.42	0.38	0.43	0.42	0.12	0.10	4.41 (*p*=.01)
	G	1.77	0.39	1.86	0.38	1.83	0.36	0.84 (*p*=.44)
	H	0.14	0.12	0.15	0.12	0.22	0.20	2.47 (*p*=.09)
	OCC	6.80	0.75	7.04	0.76	6.62	0.71	2.65 (*p*=.07)

For this latter Style the distribution with satisfaction approximates an inverted J (i.e.,).

These results suggest that attitudes toward classmates are reflected more by behaviors in non-teacher directed settings than by behaviors exhibited during structured instructional settings. The most satisfied students are characteristically peer-oriented in both appropriate (Style F) and inappropriate (Style B) interaction. Moderately satisfied students are generally less peer-oriented in their on-task and off-task behaviors than are other students. The peer interaction of the least satisfied students is characteristically off-task. These statements generally support those made in conjunction with the earlier correlational analyses, but in addition show that it is the least satisfied group of students who account for the negative social attitudes-positive behavior relationships that previously were found.

Behavioral Differences: O/W SAT Student-Instruction Interaction

The range of possible scores on this subscale of the School Attitude Test was different for the two versions of the test used (see Appendix G). The Oral Version was administered to students in grades one and three, while the Written Version was given to grade six students. For purposes of grouping students, the range of possible scores for each version was divided into thirds. Students scoring in the top third of the range were categorized as highly satisfied, those scoring in the middle third were identified as moderately satisfied, and those in the bottom third as least satisfied. The students identified as highly satisfied were then combined across grade levels to form the high group, and the procedure was repeated for middle and low groups.

Table 4.33 shows that significant differences occurred among groups for the OCC and Styles D, E, and H in TD settings, and for Styles B and G in NTD settings. It was found in the earlier correlational analyses that, with one exception, these behavioral indices were non-significantly related to student-instruction interaction attitudes. The exception is for Style B in class 2-1, where the correlation coefficient is -.653 ($p < .01$). The relationship was positive for Style G in all classes and generally positive for Style H and the OCC. Relationships with Style B were generally negative, but for Styles D and E there were no general patterns. Two-tailed tests were then used for Styles D and E only.

Examination of differences between group means showed that, in TD settings, students most satisfied with instruction exhibit more peer-dependent, off-task (Style D) behaviors, but less overall coping competency, than do the least satisfied students ($p = .01$ in both cases, two- and one-tailed tests, respectively). With respect to Styles E and H, significant differences occurred only between the least satisfied students and each of the other two attitude groups. Least satisfied students exhibit more carefully attentive, adult-dependent (Style E) behaviors than do either the moderately satisfied or most satisfied groups ($p = .00$ and $p = .03$, respectively; two-tailed tests). However, they exhibit fewer other-directed, on-task (Style H) behaviors than do other groups ($p = .02$ in both cases, two-tailed tests). The relationship between Style E and satisfaction

Table 4.33

Means, Standard Deviations, and Probabilities of Overall Mean Differences of Behavioral Style Coefficients in Teacher Directed and Non-Teacher Directed Settings for the Total Student Sample Grouped by Scores on the Student-Instruction Interaction Subtest of the School Attitude Test

		Instruction Interaction Score Levels						
		High		Middle		Low		
Set-ting	Style	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD	F ratio
TD		(n = 20)		(n = 107)		(n = 16)		
	A	0.06	0.13	0.07	0.16	0.08	0.17	0.09 (p=.91)
	B	0.47	0.26	0.37	0.27	0.50	0.36	2.32 (p=.10)
	C	0.42	0.32	0.54	0.53	0.47	0.50	0.54 (p=.58)
	D	0.50	0.30	0.38	0.26	0.22	0.12	5.52 (p=.00)
	E	0.98	0.58	1.35	0.71	1.84	0.54	7.13 (p=.00)
	F	0.03	0.04	0.03	0.05	0.01	0.02	0.67 (p=.51)
	G	0.08	0.09	0.06	0.08	0.07	0.11	0.47 (p=.62)
	H	1.77	0.45	1.68	0.43	1.36	0.30	4.94 (p=.01)
	OCC	4.88	0.38	5.11	0.52	5.34	0.46	3.80 (p=.02)
NTD		(n = 19)		(n = 98)		(n = 16)		
	A	0.13	0.22	0.10	0.16	0.12	0.20	0.50 (p=.61)
	B	0.43	0.32	0.26	0.24	0.25	0.16	4.03 (p=.02)
	C	0.39	0.35	0.36	0.53	0.14	0.08	1.31 (p=.28)
	D	0.53	0.38	0.50	0.34	0.29	0.17	2.45 (p=.09)
	E	0.30	0.21	0.23	0.16	0.32	0.14	2.87 (p=.06)
	F	0.55	0.40	0.34	0.37	0.45	0.49	2.56 (p=.08)
	G	1.58	0.28	1.86	0.39	1.92	0.31	4.86 (p=.01)
	H	0.12	0.08	0.16	0.15	0.14	0.12	0.78 (p=.46)
	OCC	6.72	0.77	6.88	0.79	7.26	0.34	2.06 (p=.13)

with instruction has an approximately L-shaped distribution (i.e., ╲), while the relationship between Style H and satisfaction has an inverted J distribution (i.e.,╱). For NTD Styles the most satisfied students are more peer-oriented, non-conforming (Style B) in their off-task behaviors than are the moderately satisfied students. For self-directed on-task (Style G) behaviors, the most satisfied students exhibit less of this behavior than the middle and low groups ($p = .00$ and $p = .02$, respectively; one-tailed tests). The relationship between Style G behaviors and satisfaction with instruction approximates an inverted L distribution (i.e., ╲).

There are *tentative* behavior profiles *suggested* by these results which point to contrasts between the most and least satisfied students with respect to teacher directed instruction. The behaviors of the most satisfied students are characteristically passive in nature. Their on-task behaviors suggest, perhaps, that these students, while passively attentive to the teacher, do not closely follow what is being taught (e.g., high Style H and low Style E behaviors). Further, their off-task behaviors consist of watching other students in class (Style D). During NTD settings their off-task behaviors are more active in nature (Style B), and their reluctance to work is reflected by little self-directed (Style G) behavior. The least satisfied students closely follow what is being taught, suggesting that they are achievement-oriented in spite of their dissatisfaction with their interaction with the teacher during instruction. This is reflected in their infrequent off-task (Style D) behaviors and their careful attention to instruction (e.g., high Style E behaviors and low Style H behaviors).

These speculative interpretations about the least satisfied and most satisfied students are not explained by differences in intelligence. The average IQ of the least and most satisfied students is 105 and 109, respectively, and the difference is nonsignificant ($p = .76$). The results suggest that students who are satisfied, in terms of the way they are treated by the teacher during instruction, reflect this satisfaction behaviorally in a manner which shows their preference for TD settings (i.e., passive off-task and on-task behaviors during instruction, and active off-task behaviors and little self-directed activity during NTD settings). On the other hand, the least satisfied students reflect their dissatisfaction not by misbehaving but by focusing carefully on what is being said during TD settings. They are more self-directed than are the most satisfied students during NTD settings. The behaviors of these least satisfied students explains an observation made in the earlier correlational analysis. There it was shown that some students who found school work to be difficult responded to the challenge by exhibiting on-task behaviors.

The observations made in this discussion generally support those found in the earlier correlational analysis with respect to the relationship between positive attitudes and on-task behavioral Styles (i.e., that students satisfied with instruction exhibit on-task behavioral Styles). However, the immediately preceding discussion makes a distinction with respect to the types of on-task Styles exhibited in TD settings. Satisfied students respond to teacher instruction with passive attention rather than careful attention. The closely attentive behaviors of dissatisfied students suggest that other factors, such as goal orientation or achievement motivation, may be better predictors for the classroom behaviors of these students than are their attitudes toward instruction.

Summary and Discussion

An examination of behavioral differences among groups of students for possible curvilinear relationships with selected achievement and attitude variables reveals that a number of such relationships exist. Further, the information provided by this analytical approach helps illuminate the nature of the process-product relationships that were unexplained by correlational analysis. Specifically, while the existence of curvilinear relationships obviously shows that there are not clear behavioral distinctions between each of the three student groups (i.e., high-, middle-, and low-scorers), it also shows that the relative similarity between two groups is a function of the type of instructional setting, the type of behavior exhibited, and the type of product measure used to group students.

To illustrate, for achievement variables the middle and low groups are similar, and lower than the high group, with respect to on-task behaviors in TD settings. This pattern occurred for Language Arts grades in class 1-1 for Style E and the OCC, and for MAT Total Reading scores and the OCC. For on-task behaviors in NTD settings the high and the middle groups are similar, and higher than the low group, as shown with Style G and the OCC for Language Arts grades in classes 1-1 and 2-3. In other words, while there is evidence for a direct relationship between achievement and on-task behaviors for both the high and low achievers in both TD and NTD settings, the middle group of achievers displays more on-task behaviors in NTD settings than they do in TD settings. This suggests that for most students,non-teacher directed settings may be more appropriate learning environments than are teacher directed settings.

For off-task behaviors in TD settings, the high and middle groups are similar, and lower than the low group, as shown by the relationship of Style C with MAT Total Reading, and by the relationship of Style B with Language Arts grades for class 1-3. The high and middle achievers are less off-task than are the low achievers in TD settings. For class 2-3 only, the middle achievers were also less peer oriented and off-task than were both high and low achievers. It appears, then, that the middle achievers are characterized not by off-task behaviors but rather by more on-task behaviors during non-teacher directed settings than they display during teacher directed structional settings.

With respect to attitudes about peer-relationships in school, where the only curvilinear relationship occurred for NTD settings, it was found that the high and middle groups of students display more social, productive behaviors (Style F) than do less satisfied students. When attitudes toward instruction were examined, the curvilinear patterns involving Styles E and H in TD settings, and G in NTD settings, suggested that the most satisfied students preferred teacher directed settings while the least satisfied students disliked such settings. With respect to both of these attitude categories it was also found that the least satisfied students were characterized by their on-task behaviors in teacher directed settings, suggesting that other factors, such as achievement motivation, may be a contributing factor to the "unexpected" behaviors of these students.

The idiosyncratic nature of the behavior-achievement relationship was demonstrated by comparing differences found between classes. For some classes (e.g., 1-3, 2-3, and 2-6) the major factor influencing the relationship between behaviors and Language Arts grades appeared to be IQ, while for others (e.g., 2-1 and 1-6) it seemed to be the sex of the student. Comparisons of pairs of students in class 1-1 revealed in some cases that behaviors were not related to achievement. Other comparisons showed in turn that behaviors were unrelated to the sex of the student, SES, or IQ.

STABILITY OF BEHAVIORS ACROSS ACADEMIC SUBJECT AREAS

Comparison of student behaviors in different subject areas is possible only in class 2-6 for non-teacher directed settings. Table 4.34 shows that behaviors displayed by students in Language Arts and Social Studies are stable for Style G (self-directed) behaviors only. It was shown earlier (see Table 4.18, p. 129) that this was the only visible Style in NTD settings for this class. The general instability of behaviors suggests that the academic subject has an important influence on the behaviors of students and that behavioral data should be collected separately for each subject area.

Table 4.34

Correlations Between Language Arts' and Social Studies' Behavior Styles in Non-Teacher Directed Settings for Students in Class 2-6 (n = 16)

Style	r
A	-0.085
B	0.227
C	-0.225
D	0.119
E	-0.026
F	0.270
G	0.522*
H	0.392
OCC	0.289

* $p < .05$

A probable contributing factor to this instability, however, is the specific nature of the setting in which these behavioral data were collected. As previously mentioned, during Social Studies classes the students worked at projects on topics they had chosen and had had approved by the teacher. Students worked in pairs while the teacher spent most of her time sitting at her desk correcting work. The students chatted with one another, moving about the room when necessary to get needed materials. While similar settings were observed in Language Arts, the predominant setting was one where students worked alone on assignments at their desk. These two types of settings reflect differences in degrees of freedom given to students in the instructional setting. The CASES manual distinguishes between these two types of settings, where the former is labelled "Program Directed Choice" and the latter is called "Program Directed" (Spaulding and Papageorgiou, 1975, pp. 54-55). During the time restricted to data collection the teacher did not use program directed choice settings often enough in Language Arts to permit comparison of student behavioral Styles across the two settings. As well, program directed settings were not used at all during Social Studies classes, so comparisons within these settings across subject areas is not possible. The apparent behavioral differences across subject areas suggested by Table 4.34 may therefore be attributable in large part to the differences in settings observed.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

SUMMARY

Relatively few studies have systematically observed the classroom behaviors of students, yet much is assumed about the importance of specific behaviors to the educational development of students. While the affective consequences of schooling are considered to be important objectives for education, studies have rarely investigated the relationship between behaviors and attitudes. Most studies conducted have focused on behavior-achievement relationships and much is still unknown about the nature of these relationships.

The major purpose of this study was to investigate the relationships of students' classroom behaviors with achievement and attitudes. Also considered were the effects of students' sex, IQ, and socioeconomic status with respect to these relationships.

A sample of 157 students in grades one, three, and six from two urban schools were observed over a two-week period using the low-inference Coping Analysis Schedule for Educational Settings. Following a one-week period of familiarization in the classrooms, approximately 16 hours were spent in each class coding the behaviors of all students in all subjects taught. Data were recorded separately for academic subject and type of instructional setting. During this period other observers coded the interaction between teachers and students with the Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System.

Following the collection of observation data, achievement scores were obtained from the linguistics competencies (Language Arts) and Mathemetics subtests of the Metropolitan Achievement Tests, the Social Studies subtest of the Stanford Achievement Test (one grade six class), and report cards. Attitudes were measured with the My Class Inventory, the School Attitude Test, and the Primary Children's Attitude Scale (grades three and six). IQ scores were obtained with the Peabody Picture Vocabulary Test (grade one) and the Canadian Lorge-Thorndike Intelligence Test (grades three and six). SES data were obtained for parents' occupations with the Blishen socio-economic index for occupations.

Correlational analyses were used to examine relationships between student behaviors with context, teacher process, and product variables. Analysis of variance was used to test for significant differences in behaviors of students selected by sex, achievement, and attitudes.

FINDINGS

The findings that were presented and discussed in Chapter 4 are as follows:

1. There were no uniform relationships across all six classes with any one particular style of students' classroom behavior, or even with broad categories of on-task and off-task behaviors, and any one of the context variables (e.g., IQ, SES or sex)

or product variables (e.g., achievement or attitudes) examined in this study. Discrepant results in relationships between student behaviors and the context and product variables were demonstrated in the following ways:

(a) Significant correlational relationships found with particular behavioral styles were negative in some cases but positive in others.

(b) The number of significant relationships that were found varied widely from class to class.

(c) Comparisons of the individual profiles of high- and low-achieving Language Arts students with respect to behaviors, IQ, SES, and sex, provided contrasting examples of major factors which seemed to influence the nature of the behavior-achievement relationships. Where there was little evidence of such relationships, the predominant factor for achievement status in some classes seemed to be IQ, for others it appeared to be sex of the student. When individual students within one class were compared with one another, there were no consistent combinations of variables which seemed to explain the nature of behaviors exhibited by high and low achievers.

2. There was not a uniform pattern for relationships found between students' SES and behaviors to suggest that higher SES students are more on-task and less off-task than are lower SES students. In examining the relationships in conjunction with other variables, it was suggested that lower SES students might be characterized by less appropriate behaviors when experiencing both dissatisfaction with school and poor academic success.

3. There was no uniformity among relationships found between IQ and behaviors. Some evidence was presented to show that the IQ-behavior relationship is affected by students' attitudes toward the instructional setting.

4. There was no pattern for the few relationships found between opportunity to respond to teacher questions about the subject matter and students' classroom behaviors.

5. Achievement variables accounted for the greatest proportion of significant relationships found with student behaviors. These relationships generally occurred in the expected direction. That is, 73% of the significant correlations found between achievement and on-task behaviors were positive, and 88% of those found between achievement and off-task behaviors were negative.

When small, homogeneous achievement groups were examined, a number of non-straight line relationships were found to show that the nature of the behavior-achievement relationship varied with type of instructional setting. In teacher directed instructional settings the average achievers resembled low achievers in exhibiting significantly less active attentive (Style E) and overall coping competency than did high achievers. In non-teacher directed instructional settings, however, the average achievers resembled the high achievers in demonstrating significantly more self-motivated (Style G) behaviors than did low achievers.

6. In contrast to findings of other studies reviewed, a number of relationships were found between students' attitudes and behaviors. These were approximately equally divided between on-task

and off-task behaviors, but the stability in pattern of these relationships was a function of the type of attitude measured. For attitudes concerning social relationships among peers, the pattern was unstable. That is, satisfied students exhibited off-task behaviors as often as they did on-task behaviors, while dissatisfied students were as likely to exhibit on-task behaviors as off-task behaviors. For attitudes toward school and instruction, however, there was generally a direct relationship with behaviors. All of the correlations between off-task behaviors and these attitudes toward schooling were negative, while 74% of those with on-task behaviors were positive.

Non-straight line relationships were also found between attitudes and behaviors when smaller groups of students were examined. Students who were moderately satisfied with their class resembled the highly satisfied students in exhibiting significantly more self- motivated (Style G) behavior in non-teacher directed settings than did the least satisfied students. Students moderately satisfied with teacher interaction during instruction also resembled those of the highly satisfied students in exhibiting significantly more passively attentive (Style H) behaviors and less actively attentive (Style E) behaviors during teacher directed instruction than did the least satisfied students. However, the moderately satisfied and least satisfied students were similar in demonstrating more self-motivated (Style G) behaviors during non-teacher directed settings than did most satisfied students.

7. The most consistent behavioral differences between boys and girls occurred for off-task behaviors. Boys characteristically exhibited more active off-task behaviors (i.e., nonconforming, resistant, peer-oriented) while the off-task behaviors of girls were passive (i.e., withdrawn, daydreaming). In general, off-task behaviors in all classes account for only 15% of all behaviors observed.

8. Evidence for differential effects of academic subject area on student behaviors is inconclusive. In the one class where this could be examined, results showed that there was general instability between behaviors in Language Arts and those in Social Studies. It is possible, however, that such differences were attributable in part to differences in the types of non-teacher directed settings which characterized these classes.

CONCLUSIONS

1. Students' classroom behaviors are affected by a multitude of factors, thereby making relationships involving one or two variables appear idiosyncratic. There is general stability in patterns of relationships with behaviors however, most notably those involving achievement and attitudes toward school.

2. Non-teacher directed instructional settings seem to be appropriate learning environments for most students. This is demonstrated by the finding that more students display higher incidences of on-task behaviors in such settings than is the case for teacher directed settings. This was related to achievement and was also a

reflection of negative attitudes toward the type of teacher directed instruction experienced.

3. There is little difference between the classroom behaviors of grade one students after one year in school when compared with the classroom behaviors of students in grades three and six. This is suggested by the similarity in the class profiles with respect to dominant behavior styles and the proportion of on-task to off-task behaviors. Where differences occur, such as with the more active participation of students in some classes, they are probably a function of differences in teaching styles.

4. Some on-task behaviors which rarely occur in particular instructional settings appear to be important characteristics of the more successful students. This is suggested by the consistency with which self-directed (Style G) behavior in teacher directed settings was positively related to achievement and attitudes.

The findings and conclusions based on correlational analyses should be interpreted with caution because of the small *n*'s used, and the nonrandom and dependent samples upon which many of the correlations were based. In some cases (see Appendix F) the number of independent variables exceeded the number of students in the sample.

RECOMMENDATIONS

Research

Studies involving the observation of students should use low inference category systems and collect data over longer periods of time so that subtle distinctions between types of on-task and off-task behaviors in different types of instructional settings can be made. Further, such observations should be made at different times of the year and in conjunction with measures of their teaching behavior, so that the adaptive process of the child to school is better understood. Children should be observed outside the class, in interaction with other children, to determine the various ways that children cope with different aspects of the school environment, since part of the child's school day is spent outside the classroom.

If better understanding of the complexity of classroom teaching and learning is to be realized, more descriptive classroom based studies involving a larger number of variables should be conducted. Simple generalizations based on few variables have little explanatory significance for teachers concerned with meeting the individual needs of students. Specific, discrete factors that are measured by attitude scales should be considered, rather than relying on global measures provided by total scores. Failure to do so in the past may account for the lack of relationships found between student behaviors and attitudes in previous studies. Preferably, more immediate product measures could be used to assess the effect of a particular instructional strategy.

Studies should examine data for curvilinear as well as linear relationships. Curvilinear relationships were suggested in this study by the use of ANOVA, which is a linear statistical model. Tests for curvilinearity (e.g., the eta coefficient) should be employed.

Inferences made about the student's mental involvement in a learning situation should be tested against other criteria, such as the teacher's impressions as well as the student's own recall of events and feelings during the time he was observed. This could be facilitated by the use of videotaping.

Teacher Education

Prospective teachers, as well as practicing teachers, could benefit from systematically observing students. Such skills would permit a more objective appraisal of students' behaviors, as well as sensitize them to ways in which students respond to various types of instruction.

BIBLIOGRAPHY

BIBLIOGRAPHY

American Educational Research Association. Second report of the Committee on the Criteria of Teacher Effectiveness. *Journal of Educational Research*, 1953, *46*, 641-659.

Amidon, E.J., & Flanders, N.A. The effects of direct and indirect teacher influence on dependent-prone students learning geometry. *Journal of Educational Psychology*, 1961, *52*, 286-291.

Anderson, G.J. *The assessment of learning environments: A manual for the Learning Environment Inventory and the My Class Inventory*, Halifax, Nova Scotia: Atlantic Institute of Education, September 1973.

Anderson, G.J., & Cayne, R.E. *My Class Inventory* (Rev. ed.). Halifax, Nova Scotia: Atlantic Institute of Education, 1969.

Ayllon, T., Layman, D., & Burke, S. Disruptive behavior and reinforcement of academic performance. *The Psychological Record*, 1972, *22*, 315-323.

Ayllon, T., & Roberts, M.D. Eliminating discipline problems by strengthening academic performance. *Journal of Applied Behavior Analysis*, 1974, *7*, 71-76.

Barker Lunn, J.C. *Primary children's attitude scale*. Slough, Buckinghamshire: National Foundation for Educational Research, 1971.

Berliner, D.C. Impediments in the study of teacher effectiveness. *Journal of Teacher Education*, 1976, *27*, 5-13.

Berliner, D.C., & Tikunoff, W.J. The California Beginning Teacher Evaluation Study: Overview of the ethnographic study. *Journal of Teacher Education*, 1976, *27*, 24-30.

Blishen, B.R. A socio-economic index for occupations. *The Canadian Review of Sociology and Anthropology*, 1967, *4*, 41-53.

Blishen, B.R. Social class and opportunity in Canada. *Canadian Review of Sociology and Anthropology*, 1970, *7*, 110-127.

Bloom, R.B. Teacher-pupil compatibility and teachers' ratings of children's behavior. *Psychology in the Schools*, 1976, *13*, 142-145.

Bronfenbrenner, U. The experimental ecology of education. *Educational Researcher*, 1976, *5* (9), 5-15.

Brophy, J.E. Reflections on research in elementary schools. *Journal of Teacher Education*, 1976, *27*, 31-34.

Brophy, J.E. Personal conversation, October, 1976.

Brophy, J.E., & Evertson, C.M. *Low-inference observational coding measures and teacher effectiveness*. Austin, Texas: Research and Development Center for Teacher Effectiveness, University of Texas, 1973. (ERIC Document Reproduction Service No. ED 077 879)

Brophy, J., & Good, T. *Teacher-Child Dyadic Interaction: A Manual for Coding Classroom Behavior*. Report No. 27. The Research and Development Center for Teacher Education, The University of Texas at Austin, 1969.

Brownell, W.A. Learning theory and the educational practice. *Journal of Educational Research*, 1948, *41*, 481-497.

Camp, B.W., & Zimet, S.G. The relationship of teacher rating scales to behavior observations and reading achievement of first-grade children. *Journal of Special Education*, 1974, *8*, 353-359.

Clifford, G.J. A history of the impact of research on teaching. In R.M.W. Travers (Ed.), *Second handbook of research on teaching*. Chicago: Rand McNally, 1973.

Cobb, J.A. The relationship of observable classroom behaviors to achievement of fourth grade pupils (Doctoral dissertation, University of Oregon, 1969). *Dissertation Abstracts International*, 1969, *30*, 3315 A. (University Microfilms No. 70-2,497)

Cobb, J.A. *Survival skills and first grade academic achievement. Report no. 1*. Eugene: Oregon University, Center for Research and Demonstration in the Early Education of Handicapped Children, 1970. (ERIC Document Reproduction Service No. ED 050 807)

Cobb, J.A. Relationship of discrete classroom behaviors to fourth-grade academic achievement. *Journal of Educational Psychology*, 1972, *63*, 74-80.

Cobb, J.A., & Hops, H. *Effects of academic survival skill training on low achieving first graders*. Eugene: Oregon University, Center at Oregon for Research in the Behavioral Education of the Handicapped. Report no. CORBEH - 12, June 1972. (ERIC Document Reproduction Service No. ED 050 807)

Cobb, J.A., & Hops, H. Effects of academic survival skill training on low achieving first graders. Journal of Educational Research, 1973, 67, 108-113.

Coker, H. Identifying and measuring teacher competencies: The Carroll County Project. Journal of Teacher Education, 1976, 27, 54-56.

Dunkin, M.J. Problems in the accumulation of process-product evidence in classroom research. British Journal of Teacher Education, 1976, 2, 175-187.

Dunkin, M.J., & Biddle, B.J. The study of teaching. New York: Holt, Rinehart & Winston, 1974.

Dunn, L.M. Expanded manual for the Peabody Picture Vocabulary Test. Circle Pines, Minnesota: American Guidance Service, 1965(a).

Dunn, L.M. Peabody Picture Vocabulary Test. Circle Pines, Minnesota: American Guidance Service, 1965(b).

Durost, W.N., Bixler, H.H., Wrightstone, J.W., Prescott, G.A., & Balow, I.H. Metropolitan Achievement Tests. New York: Harcourt Brace Jovanovich, 1970.

Eggert, W., Fasano, J., Mahen, R., Marland, P., Moody, P., & Muttart, D. Studies of teaching and learning: a preliminary report. Paper presented to the Department of Elementary Education, University of Alberta, Fall 1976.

Elmore, P.B., & Beggs, D.L. Stability of teacher ratings of pupil behavior in a classroom setting. Paper presented at the meeting of the American Personnel and Guidance Association, March, 1972. (ERIC Document Reproduction Service No. ED 066 685).

Elmore, P.B., & Beggs, D.L. Consistency of teacher ratings of pupil personality traits in a classroom setting. Measurement and Evaluation in Guidance, 1975, 8, 70-74.

Emmer, E.T., & Peck, R.F. Dimensions of classroom behavior. Journal of Educational Psychology, 1973, 64, 223-240.

Esveldt, K.C., Dawson, P.C., & Forness, S.R. Effect of videotape feedback on children's classroom behavior. Journal of Educational Research, 1974, 67, 453-456.

Ferritor, D.E., Buckholdt, D., Hamblin, R.L., & Smith, L. The noneffects of contingent reinforcement for attending behavior on work accomplished. Journal of Applied Behavior Analysis, 1972, 5, 7-17.

Flanders, N.A. Research on teaching and improving teacher education. British Journal of Teacher Education, 1976, 2, 167-174.

Forness, S.R. Classroom observation of potential special education children. (Tech. Rep. SERP-1972 - A3). Los Angeles: University of California, Graduate School of Education, September 1972 (ERIC Document Reproduction Service No. ED 088 576)

Forness, S.R. Screening kindergarten children for early intervention through direct observation of classroom behavior (Tech. Rep. SERP 1973-A3). Los Angeles: University of California, Graduate School of Education, 1973 (ERIC Document Reproduction Service No. ED 088 575)

Forness, S.R. & Esveldt, K.C. Classroom observation of children with learning and behavior problems. Journal of Learning Disabilities, 1975, 8, 382-385.

Forness, S.R., Guthrie, D., & Nihira, K. Clusters of observable behavior in high-risk kindergarten children. Psychology in the Schools, 1975, 12, 263-269.

Fortune, J.C., Gage, N.L., & Shutes, R.E. The generality of the ability to explain. Paper presented to the American Educational Research Association, Amherst, Mass., 1966.

Furst, N.F. The multiple languages of the classroom. Paper presented at the American Educational Research Association, New York, 1966(a).

Gage, N.L. Paradigms for research on teaching. In N.L. Gage (Ed.), Handbook of research on teaching. Chicago: Rand McNally, 1963.

Gallagher, J.J. Classroom behavior modification techniques applied to educationally deprived, primary age children. Special study no. 1. Durham, N.C.: The Education Improvement Program, Duke University, 1967. (ERIC Document Reproduction Service No. ED 030 683)

Glendening, L. The effects of correlated units of analysis: Choosing the appropriate unit. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, 1976.

Good, T.L., Biddle, B.J., & Brophy, J.E. Teachers make a difference. New York: Holt, Rinehart & Winston, 1975.

Heath, R.W., & Neilson, M.A. The research basis for performance-based teacher education. Review of Educational Research, 1974, 44, 463-484.

Herbert, J. Direct observation as a research technique. Psychology in the Schools, 1970, 7, 127-138.

Hops, H., & Cobb, J.A. Survival behaviors in the educational setting: Their implications for research and intervention. Report No. 13. Eugene: Oregon University, Department of Special Education. Contract No. OEC-0-70-4152(607). June, 1972. (ERIC Document Reproduction Service No. ED 069 091)

Hops, H., & Cobb, J.A. Initial investigation into academic survival-skill training, direct instruction, and first-grade achievement. Journal of Educational Psychology, 1974, 66, 548-553.

Hough, J.B., & Duncan, J.K. Teaching: description and analysis. Reading, Mass.: Addison-Wesley, 1970.

Hughes, D.C. An experimental investigation of the effects of pupil responding and teacher reacting on pupil achievement. American Educational Research Journal, 1973, 10(1), 21-37.

Hughes, T.M. A study of the relationship of coping strength to self-concept, school achievement, and general anxiety level in sixth grade pupils (Doctoral dissertation, University of Tennessee, 1967). Dissertation Abstracts, 1968, 28, 4001A. (University Microfilms No. 68-3747)

Hursh, H.B., Baer, D.M., & Rowbury, T. A pilot project to determine whether teachers "turn on" only when observers are present. Paper presented at the meeting of the American Psychological Association, New Orleans, 1974. (ERIC Document Reproduction Service No. ED 107 622)

Hundert, J., Bucher, B., & Henderson, M. Increasing appropriate classroom behavior and academic performance by reinforcing correct work alone. Psychology in the Schools, 1976, 13, 195-200.

Jackson, G.B. Comments on Heath and Neilson's "The research basis for performance-based teacher education." Classroom Interaction Newsletter, 1976, 11, 46-49.

Jackson, P.W. Life in classrooms. New York: Holt, Rinehart & Winston, 1968.

Jones, E., & Saucedo, M. del R. Learning environment in ESAA methematics laboratories, Edcouch-Elsa Independent School District. San Antonio, Texas: D.C. Development Associates, December 15, 1975.

Kennedy, J.J., & Bush, A.J. Overcoming some impediments to the study of teacher effectiveness. Journal of Teacher Education, 1976, 27, 14-17.

Kim, Y., Anderson, H.E., Jr., & Bashaw, W.L. The simple structure of social maturity at the second grade level. Educational and Psychological Measurement, 1968, 28, 145-153(a).

Kim, Y., Anderson, H.E., Jr., & Bashaw, W.L. Social maturity, achievement, and basic ability. Educational and Psychological Measurement, 1968, 28, 535-543.

Kounin, J.S. Discipline and group management in classrooms. New York: Holt, Rinehart & Winston, 1970.

Kounin, J.S., Friesen, W.V., & Norton, E. Managing emotionally disturbed children in regular classrooms. Journal of Educational Psychology, 1966, 57, 1-13.

Kounin, J.S., & Gump, P.V. The ripple effect in discipline. Elementary School Journal, 1958, 35, 158-162.

Kramer, S.B. The relation between pupil on-task behavior and achievement in classroom behavior modification (Doctoral dissertation, Columbia University, 1971). Dissertation Abstracts International, 1971, 32, 5039A. (University Microfilms No. 72-10,442)

Lahaderne, H.M. Attitudinal and intellectual correlates of attention: A study of four sixth-grade classrooms. Journal of Educational Psychology, 1968, 59, 320-324.

Lerner, E. Experiments in active play techniques. In L. Murphy (Ed.), Methods for the study of personality in young children (I). New York: Basic Books, 1956.

Lorge, I., Thorndike, R.L., Hagen, E., & Wright, E.N.(Ed.). Manual for administration: Canadian Lorge-Thorndike Intelligence Tests. Toronto: Thomas Nelson & Sons, 1967(a).

Lorge, I., Thorndike, R.L., Hagen, E., & Wright, E.N. Canadian Lorge-Thorndike Intelligence Tests. Boston: Houghton Mifflin, 1967(b).

Madden, R., Gardner, E.F., Rudman, H., Karlsen, B., & Merwin, J.C. Stanford Achievement Tests. New York: Harcourt Brace Jovanovich, 1973.

Masling, J., & Stern, G. Effect of the observer in the classroom. Journal of Educational Psychology, 1969, 60, 351-354.

Matheny, K.B., & Edwards, C.R. Academic improvement through an experimental classroom management system. Journal of School Psychology, 1974, 12, 222-232.

McCallon, E. School Attitude Test. Austin, Texas: Learning Concepts, 1973.

McGaw, B., Wardrop, J.L., & Bunda, M.A. Classroom observation schemes: Where are the errors? American Educational Research Journal, 1972, 9, 13-27.

McKinney, J.D., Mason, J., Perkerson, K., & Clifford, M. Relationship between classroom behavior and academic achievement. Journal of Educational Psychology, 1975, 67, 198-203.

McNeil, J.D., & Popham, W.J. The assessment of teacher competence. In R.M.W. Travers (Ed.), Second handbook of research on Teaching. Chicago: Rand McNally, 1973.

Meyers, C.E., Attwell, A.A., & Orpet, R.E. Prediction of fifth grade achievement from kindergarten test and rating data. Educational and Psychological Measurement, 1968, 28, 457-463.

Murphy, L.B. (Ed.). Methods for the study of personality in young children. New York: Basic Books, 1956.

Nuthall, G.A. Studies of teaching: Types of research on teaching. New Zealand Journal of Educational Studies, 1968, 3, 125-147.

Nuthall, G.A. Is classroom interaction research worth the effort involved? New Zealand Journal of Educational Studies, 1974, 9, 1-17.

Papageorgiou, M. Using CASES in measuring effects of compensatory education. Paper presented at the annual meeting of the American Educational Research Association, New Orleans, 1973.

Peck, R.F. Coping styles and achievement: A cross-national study of school children. (Volume II of VIII Volumes. Cultural Patterns of Coping). USOE Contract 5-85-063, The University of Texas at Austin, 1972. (ERIC Document Reproduction Service No. ED 065 825)

Peck, R.F. Promoting self-disciplined learning: a researchable revolution. In B.O. Smith (Ed.), Research in teacher education; a symposium. Englewood Cliffs, N.J.: Prentice-Hall, 1971, 82-98.

Peck, R.F., Angelini, A.L., Diaz-Guerrero, R., Miller, K.M., Jaide, W., Weinert, F., Piquardt, R., Zorman, L., Tolicic, I., Cesa-Bianchi, R.J., & Kubo, S. A replication study of coping patterns in eight countries (Volume V (a&b) of final report of project, Coping styles and achievement: a cross-national study of school children, Project HRD-167-65). (Personality Research Center, The University of Texas at Austin, 1973). (ERIC Document Reproduction Service No. ED 078 342)

Peck, R.F., Diaz-Guerrero, R., & Havighurst, R.J. An international effort to conceptualize and measure coping behavior. USOE Contract 5-85-063, Chicago University, Illinois; National Autonomous University of Mexico; The University of Texas at Austin, 1971. (ERIC Document Reproduction Service No. ED 057 380)

Perkins, H.V. A procedure for assessing the classroom behavior of students and teachers. American Education Research Journal, 1964, 1, 249-260.

Perkins, H.V. Classroom behavior and underachievement. American Education Research Journal, 1965, 2, 1-12.

Pineo, P.C., & Porter, J. Occupational prestige in Canada. The Canadian Review of Sociology and Anthropology, 1967, 4, 24-40.

Prescott, G.A. Metropolitan Achievement Tests Manual for Interpreting. New York: Harcourt Brace Jovanovich, 1973.

Reid, J.B. Reliability assessment of observation data: A methodological problem. Child Development, 1970, 41, 1143-1150.

Rian, H. Teacher leadership and pupil reaction: The authoritarian-democratic dimension revisited. Scandanavian Journal of Educational Research (Pedagogisk Forskning), 1969, 13, 1-15.

Rivera, J. School Attitude Test: Oral Version. Austin, Texas: Learning Concepts, 1973.

Rosenshine, B. Teaching behaviors and student achievement. Windsor, Berkshire, England: National Foundation for Educational Research in England and Wales, 1971.

Rosenshine, B. Recent research on teaching behaviors and student achievement. Journal of Teacher Education, 1976, 27, 61-64.

Rosenshine, B., & Furst, N. Research on teacher performance criteria. In B.O. Smith (Ed.), Research on Teacher education: A symposium. Englewood Cliffs, N.J.: Prentice-Hall, 1971, 37-72.

Rosenshine, B., & Furst, N. The use of direct observation to study teaching. In R.M.W. Travers (Ed.), Second handbook of research on teaching. Chicago: Rand McNally, 1973.

Samph, T., & White, S. An analysis of selected classroom behavior category systems. Final Report. New York: Syracuse University, National Institute of Education (Department of Health, Education and Welfare), Washington, D.C. Bureau no. BP-2-B-080. February, 1973. (ERIC Document Reproduction Service No. ED 110 419)

Samuels, S.J., & Turnure, J.E. Attention and reading achievement in first-grade boys and girls. Journal of Educational Psychology, 1974, 66, 29-32.

Sharp, C.S. A study of certain teacher characteristics and behavior as factors affecting pupil achievement in high school biology (Unpublished doctoral dissertation, University of South Carolina, 1966). Dissertation Abstracts, 1966, 27, 1207A. (University Microfilms No. 66-11,601)

Shulman, L. Personal conversation, Fall, 1976.

Sibley, S.A., Abbott, M.S., & Cooper, B.P. Modification of the classroom behavior of a disadvantaged kindergarten boy by social reinforcement and isolation. Journal of Experimental Child Psychology, 1969, 7, 203-219.

Simmons, J.T., & Wasik, B.H. Use of small group contingencies and special activity time to manage behavior in a first-grade classroom. Journal of School Psychology, 1973, 11, 228-238.

Soar, R.S. An integrative approach to classroom learning. Temple University, Philadelphia, 1966.

Soar, R.S., & Soar, R.M. An attempt to identify measures of teacher effectiveness from four studies. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, 1976.

Soli, S.D. Dimensions of achievement-related behavior: An analysis of the behavior patterns of fourth grade students. Unpublished manuscript, 1974. (Available from author, Center for Research in Human Learning, 205 Elliott Hall, University of Minnesota, Minneapolis, Minnesota 55455).

Soli, S.D., & Devine, V.T. Behavioral correlates of achievements: A look at high and low achievers. Journal of Educational Psychology, 1976, 68, 335-341.

Solomon, D., & Kendall, A.J. Teachers' perceptions of and reactions to misbehavior in traditional and open classrooms. Journal of Educational Psychology, 1975, 67, 528-530.

Spaulding, R.L. Achievement, creativity, and self-concept as correlates of teacher-pupil transactions in elementary school classrooms. Hempstead, N.Y.: Hofstra University, Cooperative Research Project no. 1352, 1965. (ERIC Document Reproduction Service No. ED 024 463)

Spaulding, R.L. Effects of a five-year compensatory education program on social, intellectual, linguistic, and academic development. Paper presented at the annual meeting of the American Educational Research Association, Chicago, 1972.

Spaulding, R.L. The Coping Analysis Schedule for Educational Settings (CASES) Paper presented at the annual meeting of the American Educational Research Association, New Orleans, 1973. (ERIC Document Reproduction Service No. ED 076 694)

Spaulding, R.L. Mandated competency-based teacher certification and the public interest. Paper presented at the annual meeting of the American Educational Research Association, Washington, D.C., 1975. (ERIC Document Reproduction Service No. ED 104 849)

Spaulding, R.L. Personal conversation, March 10, 1976.

Spaulding, R.L., & Papageorgiou, M. Effects of early intervention in the lives of disadvantaged children. Final report. San Jose: California State University, 1972. (ERIC Document Reproduction Service No. ED 066 246)

Spaulding, R.L., & Papageorgiou, M. Observation of the coping behavior of children in elementary schools. San Jose: San Jose State University, August 1975.

Spaulding, R.L., & Showers, B. Applications of the Spaulding system of classroom behavioral analysis in field settings. Paper presented at the annual meeting of the American Educational Research Association, Chicago, 1974. (ERIC Document Reproduction Service No. ED 091 399)

Spivack, G., & Swift, M.S. The Devereux Elementary School Behavior Rating Scales: A study of the nature and organization of achievement related disturbed classroom behavior. Journal of Special Education, 1966, 1, 71-90.

Spivack, G., & Swift, M. The classroom behavior of children: A critical review of teacher-administered rating scales. Journal of Special Education, 1973, 7, 55-89.

Swift, M.S., & Spivack, G. The assessment of achievement related classroom behavior. Journal of Special Education, 1968, 2, 137-153.

Swift, M.S., & Spivack, G. Clarifying the relationship between academic success and overt classroom behavior. Exceptional Children, 1969, 36, 99-104.

Taba, H. Teaching strategies and cognitive functioning in elementary school children. USOE Cooperative Research Project No. 2404, San Francisco State College, 1966.

Taba, H., Levine, S., & Elzey, F.F. Thinking in elementary school children. USOE Cooperative Research Project No. 1574, San Francisco State College, 1964.

Taplin, P.S., & Reid, J.B. Effects of instructional set and experimenter influence on observer reliability. Child Development, 1973, 44, 547-554.

Walker, H.M., & Hops, H. Increasing academic achievement by reinforcing direct academic performance and/or facilitative nonacademic responses. Journal of Educational Psychology, 1976, 68, 218-225.

Wasik, B.H., Senn, K., Welch, R.H., & Cooper, B. Behavior modification with culturally deprived school children: Two case studies. Journal of Applied Behavior Analysis, 1969, 2, 181-194.

Wasik, B.H. The application of Premack's generalization on reinforcement to the management of classroom behavior. Journal of Experimental Child Psychology, 1970, 10, 33-43.

Werry, J.S., & Quay, H.C. Observing the classroom behavior of elementary school children. Exceptional Children, 1969, 35, 461-470.

White, B.L., & Watts, J.C. Experience and environment: major influences on the development of the young child. (Vol. 1). Englewood Cliffs, N.J.: Prentice Hall, 1973.

Winett, R.A., & Roach, A.M. The effects of reinforcing academic performance on social behavior: A brief report. The Psychological Record, 1973, 23, 391-396.

Wright, C.J. & Nuthall, G. Relationships between teacher behaviors and pupil achievement in three experimental elementary science lessons. American Educational Research Journal, 1970, 7, 477-491.

Yamamoto, K. Analysis of teaching - Another look. The School Review, 1967, 75, 205-215.

APPENDICES

APPENDIX A

A COPING ANALYSIS SCHEDULE FOR EDUCATIONAL SETTINGS (CASES)

(Brief Form for Quick Reference)

CASES STYLES-Work Sheet

CASES Coding Sheet

A Coping Analysis Schedule
for Educational Settings (CASES)*

(Brief Form for Quick Reference)**

1. Aggressive Behavior:
Direct attack: grabbing, pushing, hitting, pulling, kicking, name-calling; destroying property: smashing, tearing, breaking.

2. Negative (Inappropriate) Attention-Getting Behavior:
Annoying, bothering, whining, loud talking (unnecessarily), attention getting aversive noise-making, belittling, criticizing.

3. Manipulating, Controlling, and Directing Others:
Manipulating, bossing, commanding, directing, enforcing rules, conniving, wheedling, controlling.

4. Resisting:
Resisting, delaying; passive aggressive behavior; pretending to conform, conforming to the letter but not the spirit; defensive checking.

5. Self-Directed Activity:
Productive working; reading, writing, constructing with interest; self-directed dramatic play (with high involvement).

6. Paying Close Attention; Thinking, Pondering:
Listening attentively, watching carefully; concentrating on a story being told, a film being watched, a record played; thinking, pondering, reflecting.

7. Integrative Sharing and Helping:
Contributing ideas, interests, materials, helping; responding by showing feelings (laughing, smiling, etc.) in audience situations; initiating conversation.

8. Integrative Social Interaction:
Mutual give and take, cooperative behavior, integrative social behavior; studying or working together where participants are on a par.

9. Integrative Seeking and Receiving Support, Assistance and Information:
Bidding or asking teachers or significant peers for help, support, sympathy, affection, etc., being helped; receiving assistance.

---

* C 1966, Robert L. Spaulding

** Revised August 12, 1968.

10. Following Directions Passively and Submissively:
Doing assigned work without enthusiasm or great interest; submitting to requests; answering directed questions; waiting for instructions as directed.

11. Observing Passively:
Visual wandering with short fixations; watching others work; checking on noises or movements; checking on activities of adults or peers.

12. Responding to Internal Stimuli:
Daydreaming; sleeping; rocking or fidgeting; (not in transaction with external stimuli).

13. Physical Withdrawal or Passive Avoidance:
Moving away; hiding: avoiding transactions by movement away or around; physical wandering avoiding involvement in activities.

Note: Categories 3, 5, 6, 7, 8, and 9 are further coded as a or b in structured settings to indicate appropriate or inappropriate timing or location of activity (based on the teacher's expectations for the setting). Example: 5a would be recorded when a child was painting during art period (when painting was one of the expected activities). Painting during "story time" or in an academic setting would normally be coded 5b. The code b represents behaving in a certain coping category at the "wrong" time or place. What is "right" or "wrong" is based on the values and goals of the teacher or authority responsible in a given situation.

A child might be sharing with another child in an integrative manner (7) some bit of information the teacher regarded as highly inappropriate. It would be coded as 7b since it was an integrative act of sharing occurring at the "wrong" time in the "wrong" place, from the point of view of the teacher.

CASES STYLES-Work Sheet

School______________ Teacher________________ Observer________________ Date________

Subject (Child's code name)____________________ Setting______________________________

ES f

1 _____

2 _____

3a _____

3b _____

4 _____

5a _____

5b _____

6a _____

6b _____

7a _____

7b _____

8a _____

8b _____

9a _____

9b _____

10 _____

11 _____

12 _____

13 _____

Σf ☐ ①

STYLE A (Aggressive, manipulative)

c1 _____

c2 _____

c3b _____

c9b _____

Total A _____ ②

② x100/① = ☐ ③ %

③/4 = ☐ ④

Visibility A

STYLE B (Peer oriented, non-conforming, resistant)

c4 _____

c5b _____

c7b _____

c8b _____

Total B _____ ⑪

⑪ x100/① = ☐ ⑫ %

⑫ /25 = ☐ ⑬

Visibility B

STYLE C (Withdrawn)

c12 _____

c13 _____

Total C _____ ⑧

⑧ x100/① = ☐ ⑨ %

⑨/5 = ☐ ⑩

Visibility C

STYLE D (Peer dependent)

c6b _____

c11 _____

Total D _____ ⑤

⑤ x100/① = ☐ ⑥ %

⑥/20 = ☐ ⑦

Visibility D

STYLE E (Adult dependent)

c6a _____

c7a _____

c9a _____

Total E _____ ⑭

⑭ x100/① = ☐ ⑮ %

⑮ /20 = ☐ ⑯

Visibility E

STYLE F (Social, productive)

c3a _____

c8a _____

Total F _____ ⑰

⑰ x100/① = ☐ ⑱ %

⑱ /20 = ☐ ⑲

Visibility F

Overall Coefficient

(Range = 1 to 10)

%A_____ x4=_________

%B_____ x3=_________

%C_____ x1=_________

%D_____ x2=_________

%E_____ x7=_________

%F_____ x10=_________

%c5a_____ x8=_________

%c10_____ x5=_________

Σ_____ Σ_________ /100 = ☐ Overall Coeff.

STYLE G (Inner-directed, task-oriented)

c5a_____ x 100/① = ☐ ⑳ %

⑳ /35 = ☐ ㉑

Visibility G

STYLE H (Other-directed, task-oriented)

c10_____ x 100/① = ☐ ㉒ %

㉒ /30 = ☐ ㉓

Visibility H

Pupils
a.
b.
c.
d.
e.
f.

Date__________ Sch/T__________ Time in____ Out_____

Setting_______ Obs______________ Codes___________

Subject_______

	1	2	3a	3b	4	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10	11	12	13
1																			
2																			
3																			
4																			
5																			
6																			
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a																			
b																			
c																			
d																			
e																			
f																			

APPENDIX B

DESCRIPTION OF CATEGORIES IN THE LOW INFERENCE DYADIC INTERACTION CLASSROOM OBSERVATION SYSTEM

Section I.	Summary of Categories in the Expanded Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System
Section II.	Definitions of One Modified Category and Two New Categories in the Expanded Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System

SECTION I

Summary of Categories in the Expanded Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System

The major aspects of classroom life coded by this system are represented by the four cells in the diagram appearing below. Within each cell are the sub-categories of those four aspects which are then further broken down into still smaller units.

	Public response opportunities	Private dyadic teacher-pupil contacts
Teacher afforded	A.	C. I. Work-related II. Personal III. Procedure-related IV. Behavior-related V. Don't know
Student initiated	B. I. Student Initiated Questions II. Student Initiated Comments	D. I. Work-related II. Personal-related III. Don't know

A. **Teacher Afforded Response Opportunities**

The three key aspects of this category of classroom event are:

(a) they are public interactions between the teacher and a child, intended to be monitored by the class or group with which the teacher is working;

(b) they occur when the teacher asks a question requiring either a verbal or nonverbal response;

(c) only one child makes the response.

For each response opportunity that is coded, information has to be checked off in each of four subcategories: (1) type of response opportunity; (2) level of question asked; (3) quality of child's answer; (4) nature of the teacher's feedback reaction.

(1) Types of response opportunity

Predesignated (PRE): teacher names the child first and then asks a question;

Non volunteer (N. VOL): teacher asks a question first but calls for a response from a child who has not raised his hand;

Volunteer (VOL): teacher asks a question first and invites a response from a child with hand raised;

Called out (CALL): teacher asks a question but a child calls out the answer before the teacher has a chance to select a respondent; the teacher nevertheless responds to the child who called out the answer.

(2) Level of question asked

Process (PCSS): question requiring student to integrate facts or show knowledge of their relationships.

Product (PROD): question for which a specific correct answer is sought.

Choice (CHOIS): question requiring an answer to be selected from one of the alternatives presented.

Self Reference (SELF REF): question requiring child to make a non-academic contribution to the classroom discussion. This type of question has then to be further classified as subject-matter related (SUB) or non subject-matter related (NON SUB) and then whether it requires the child to show a preference (PREF) or to give information about his past experience (EXP).

Opinion: question requiring student to take a position on an issue or to predict the outcome of an experiment or hypothetical situation. If the child gives no response (NR) this is coded. On the other hand if the child does respond, the teacher's reaction to the answer is coded: if it is praised ($\overset{+}{+}$), criticized ($\overset{-}{-}$), ignored (0), accepted (ACPT), integrated (INTEG) into the ongoing discussion, or if the teacher disagrees (DISAG) with the child's opinion.

(3) Quality of child's answer

The child's answer is coded as correct (+), partially correct (±), incorrect (-), or no response (NR) but, if the child indicates that he doesn't know, this item of information is also coded.

(4) Nature of the teacher's feedback response.[1]

The teacher's reaction to the child's response has been categorized as terminal or sustaining. Reaction which is terminal, that is, it has the effect of terminating the interaction with the child, could be one of seven types. The teacher may praise ($\overset{+}{+}$), criticize ($\overset{-}{-}$), provide no response (NR) give process feedback (CSS), give the correct answer (GIV ANS), ask another (ASK OTH) child for the answer, or the answer may be called out (CALL) by another student. Reaction which is sustaining, that is, it has the effect of prolonging the interaction, could be one of three kinds. The teacher may repeat the question (REPT Q), rephrase the question or give a clue (REP or CLU), or ask a new question (NEW Q).

B. Student Initiated Response Opportunities

I. Student Initiated Questions

This category of response opportunity is used if the student asks the teacher a question regarding the subject matter under discussion or some other matter. If the student calls out (CALL) the question without prior teacher approval, this point is coded and also if the question is relevant (REL) or irrelevant (IRREL). Two kinds of teacher reaction to the question, praise ($\overset{+}{+}$) and criticism ($\overset{-}{-}$), are coded if they occur, and also types of teacher feedback. The teacher may provide no feedback (0) (i.e. ignore the question), delay (DELAY) her anser, not accept (NACPT) it into the discussion, provide a brief or long answer or she may redirect (RDRCT) the question to another student. Three other categories praise (+), criticism (-), and warning (WARN) are provided if the teacher makes a reaction related to the student's behavior in initiating the question.

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[1] Modifications to the subcategories of teacher feedback as defined in the Expanded Brophy-Good System were made and are reported in Appendix B, Section II.

II. Student Initiated Comments

The details surrounding a student initiated comment that are coded are very similar to those for a student initiated question. All but three teacher response categories, brief, long, and redirect (RDRCT) are retained. They are replaced by another three. The teacher may accept (ACPT) the student comment, integrate (INTEG) it into the class discussion, or may use it to shift the direction of the class discussion.

C. Teacher Afforded Dyadic Contacts

I. Teacher Afforded Contacts (Work-related)

These are instances when the teacher makes private contact with an individual child about his work. Several features of these contacts are coded. The contact may be long, brief or it may be one in which the teacher just observes (OBSV) without entering into verbal interaction. If the contact is a long or brief one, praise (+) or criticism (-) is coded also if the teacher's comments include such reactions. A don't know (?) category is used if the interaction between teacher and child is not audible to the coder.

II. Teacher Afforded Contacts (Personal)

These contacts do not involve either work content or procedure but are of a strictly personal nature.

III. Teacher Afforded Contacts (Procedure-related)

Within this category a distinction is made between those instances when a teacher seeks a favor (child helps in running the classroom) and those in which the request have to do with getting the child ready to work. The latter are coded as management (MANAG). Thank you (THANKS) is coded if the teacher thanks the child following the management or favor request.

IV. Teacher Afforded Contacts (Behavior-related)

This category is used whenever the teacher makes some comment on the child's classroom behavior. They are subdivided into praise (+), non-verbal intervation (NVI), warnings (WARN), and criticism (-). Errors which the teacher makes when warning a child are also noted. Three kinds of errors, target errors (TARG), timing errors (TIM), and overreactions (OVERT) are coded. The no error category is used whenever the teacher does not make one of the three errors. Provision also exists for the coder to recrod his uncertainty (?) if he is not sure that an error has occurred.

V. Don't know (?) is coded if the teacher-pupil communication is inaudible to the coder and the coder is unable to determine which of the above four types of teacher afforded contacts is occurring.

D. Student Initiated Dyadic Teacher-Pupil Contacts (referred to as Child Created Contacts on the coding sheets)

I. Child Created Contacts (Work-related)

This type of contact may relate to work content (CONT) or work procedures (PROC). The teacher's feedback to the child is also coded, whether the teacher offers praise (+) or criticism (-), and whether the contact is brief, long, or delayed (DELAY) by the teacher.

II. Child Created Contacts (Personal-related)

In this category there are two first-order divisions, experience (EXP) sharing and procedural (PROC). All experience sharing contacts are personal ones in which the student contacts the teacher to tell him something which is not related to either classroom work or procedure. The teacher's response is coded as either acknowledged (ACK) (i.e. the contact is acknowledged by the teacher) or delay (i.e. the teacher indicates she is unable to listen or talk to the pupil at that time).

A procedural contact occurs when the pupil is making a request, offers to do an errand, or reminds the teacher of something. The teacher's reaction is coded as grant or non-grant (N GRANT) (teacher has or has not granted the request) or as delay.

III. Don't Know

If the communication in the child created contact is inaudible to the coder, the don't know (?) column is used.

SECTION II

Definitions of One Modified Category and Two New Categories in the Expanded Brophy-Good Teacher-Pupil Dyadic Interaction Classroom Observation System

No Feedback Reaction (0)

This category of terminal teacher feedback in the Brophy-Good system has been restricted in meaning in this study. This part of the original statement now embodies its full meaning.

> "If the teacher makes no response whatsoever following the child's answer to the question, he is coded for no feedback reaction (0). This means that he makes no verbal response to the child and does not communicate affirmation or negation by shaking his head in response to the answer. Instead, he merely moves on to something else, perhaps by starting to make a new point or by asking another child a question. Most coders will be surprised to find that this category is used much more often than they had expected. It frequently happens that the teacher makes no feedback reaction at all to the child's answer, especially in fast moving question drills where he is pushing to get correct answers in an impersonal fashion, without paying attention to the individual child giving the answer" (Brophy & Good, 1970, p. 17).

Affirmative Teacher Reaction (AFFIRM)

This category of teacher reaction within an academic response opportunity is defined as a terminal teacher reaction which does not go beyond the level of simple affirmation. The teacher simply indicates that the child has given a correct response. He does not communicate a warm personal reaction to the child. There is merely an impersonal communication of information. For example, the teacher repeats the student's answer or thanks the pupil without explicity or implicit praise. The teacher's intent is to terminate student involvement.

Repeats Student Statement (REP SS)

This is an additional category in the set of teacher reactions in academic response opportunities described as sustaining. In this category are to be coded all those instances when the teacher repeats the child's answer in a quizzical manner without indicating whether he considers it to be correct or incorrect, or when the teacher restates the pupil answer for the purpose of having the student confirm what he had just said. The principal criterion to be used in distinguishing a Repeats Student Statement is whether the teacher's intention was to sustain the student's involvement by having the pupil clarify for himself and/or for others the meaning of his previous response.

APPENDIX C

CASES RELIABILITY MEASURES

TABLE C I

CASES RELIABILITY MEASURES—PERCENTAGE AGREEMENT OF THREE CODERS WITH THE TRAINING VIDEOTAPE PROTOCOLS

		Coders			
Test No.	Subject	A	B	C	
1	Fred	80.77	73.08	65.38	
2	Wayne	51.02	46.15	63.27	
3	Fred	80.77	80.77	69.23	
4	Wayne	71.43	53.06	67.35	
5	Fred	88.46	78.85	73.08	
6	Wayne	79.59	75.51	71.43	
7	Fred	96.15	88.46	80.77	
8	Wayne	95.92	83.67	87.76	
		$\bar{x}$ 80.51	$\bar{x}$ 72.44	$\bar{x}$ 72.28	Grand $\bar{x}$ 75.08

TABLE C II

CASES RELIABILITY MEASURES TAKEN IN CLASSROOMS—PERCENTAGE AGREEMENT BETWEEN CODERS DURING TRAINING

			Coders			
Test No.	Grade	Setting	A & B	A & C	B & C	ABC
1	6	N-T.D.	66.67	56.86	70.59	71.33
2	6	T.D.	52.94	58.82	49.02	80.67
3	6	T.D.&N-T.D.	66.00	74.00	78.00	80.67
4	6	N-T.D.	64.00	66.00	80.00	79.33
5	6	T.D.&N-T.D.	77.27	31.82	31.82	63.89
6	6	N-T.D.	33.33	60.78	35.29	66.67
7	6	N-T.D.	90.20	88.24	88.24	93.33
8	6	N-T.D.	76.00	76.00	70.00	86.67
9	2	N-T.D.	55.10	65.31	53.06	68.00
10	2	T.D.	54.00	58.00	64.00	68.00
11	6	N-T.D.	35.90	46.15	48.72	48.00
12	6	N-T.D.	92.00	82.00	84.00	92.00
13	6	N-T.D.	82.00	90.00	82.00	91.33
14	2	N-T.D.	50.00	46.00	56.00	66.67
15	2	N-T.D.	66.00	72.00	62.00	81.33
16	2	T.D.	62.00	52.00	50.00	76.00
17	6	N-T.D.	77.78	88.89	88.89	86.67
18	6	T.D.	80.00	90.00	74.00	85.33
19	6	T.D.	48.00	50.00	74.00	73.33
20	6	T.D.	66.67	54.55	48.48	74.74
21	6	N-T.D.	80.00	74.00	78.00	86.67
22	6	N-T.D.	74.00	70.00	70.00	80.00
23	2	T.D.	72.00	64.00	66.00	82.00
24	2	T.D.	58.00	66.00	56.00	78.00
25	2	T.D.	68.00	70.00	68.00	78.67
26	2	T.D.	58.82	61.76	52.94	76.76
27	6	N-T.D.	74.00	72.00	74.00	86.00
28	6	N-T.D.	62.00	70.00	68.00	81.33
29	6	N-T.D.	48.00	60.00	56.00	72.67
30	6	N-T.D.	62.00	68.00	70.00	88.51
31	6	T.D.	74.00	64.00	70.00	78.47
32	6	T.D.	78.00	78.00	72.00	80.00
33	6	T.D.	66.00	66.00	76.00	84.00
34	6	T.D.	60.87	52.17	54.34	80.67
35	6	N-T.D.	71.79	43.59	48.72	71.92
36	6	T.D.&N-T.D:	86.00	88.00	88.00	96.67
		Σ	2389.34	2374.94	2356.11	2836.30
		$\bar{x}$	66.37	65.97	65.45	78.79
		Range	33.33- 92.00	31.82- 90.00	31.82- 88.89	63.89- 96.67

Average of paired means 65.93

TABLE C III

CASES RELIABILITY MEASURES TAKEN DURING DATA COLLECTION—PERCENTAGE AGREEMENT OF THREE CODERS WITH THE TRAINING VIDEOTAPE PROTOCOLS

		Coders			
Test No.	Subject	A	B	C	
1	Fred	96.15	94.23	96.15	
2	Wayne	87.76	91.84	83.67	
3	Fred	96.15	94.23	71.15	
4	Fred	94.23	90.38	86.54	
5	Wayne	83.67	89.80	91.84	
		$\bar{x}$ = 91.59	$\bar{x}$ = 92.10	$\bar{x}$ = 85.87	Grand $\bar{x}$ = 89.85

TABLE C IV

CASES RELIABILITY MEASURES—PERCENTAGE AGREEMENT BETWEEN CODERS WITH SAMPLE STUDENTS DURING DATA COLLECTION

Test No.	Grade	Setting	Coders A & B	 B & C	
1	1	T.D.	68.00	--	
2	1	N-T.D.	88.00	--	
3	6	T.D.	--	74.00	
4	6	N-T.D.	--	80.00	
5	3	T.D.	--	63.00	
6	3	N-T.D.	--	82.00	
7	3	T.D.	--	88.00	
8	1	T.D.	78.00	--	
9	1	N-T.D.	74.00	--	
			$\bar{x} = 77.00$	$\bar{x} = 77.40$	Grand $\bar{x} = 77.22$

APPENDIX D

INTERCODER RELIABILITY MEASURES OBTAINED WITH THE LOW INFERENCE CLASSROOM OBSERVATION SYSTEM

Table D I

Intercoder Reliability Measures Obtained During Training with the Low Inference Classroom Observation System

	Percentage Agreement														
	Coders 1 & 2					Coders 1 & 3					Coders 2 & 3				
Variable / Check No.	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Academic Response Opportunity															
Type of Respondent	82	100*	70	--†	--	82	70	55	--	--	80	70	78	--	--
Question Type	73	75	71	--	--	36	100	33	--	--	30	75	33	--	--
Child Answer	85	80	64	--	--	69	89	58	--	--	64	80	78	--	--
T. Feedback on PCSS, PROD, CHOIS	43	67	50	--	--	60	78	71	--	--	60	67	78	--	--
T. Feedback on Opinion Q's	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Student Initiated Question															
Type	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Relevancy	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T. Feedback	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Student Initiated Comment															
Type	100	--	--	--	--	66	--	--	--	--	66	--	--	--	--
Relevancy	100	--	--	--	--	66	--	--	--	--	66	--	--	--	--
T. Feedback	66	--	--	--	--	66	--	--	--	--	66	--	--	--	--
Dyadic Contact															
Type	100	--	--	65	86	64	--	--	76	92	64	--	--	84	92
Child Created Contact (CCC)															
Type	100	--	--	90	83	0	--	--	87	95	0	--	--	96	79
CCC (WK-REL)															
T. Reaction (DELAY, BRIEF, LONG)	100	--	--	79	86	0	--	--	100	88	0	--	--	79	78
T. Reaction (‡, =)	--	--	--	--	56	--	--	--	--	45	--	--	--	--	78
CCC (PERS-REL)															
Type	--	--	--	25	50	--	--	--	43	50	--	--	--	50	75
T. Reaction (ACK, DELAY)	--	--	--	--	0	--	--	--	--	100	--	--	--	--	0
T. Reaction (GRANT, NONGRANT)	--	--	--	25	33	--	--	--	43	0	--	--	--	50	0
Teacher Afforded Contact (TAC)															
Type	89	--	--	45	73	58	--	--	60	92	57	--	--	71	73
TAC (WK-REL)															
Type (OBSV, BRIEF, LONG)	--	--	--	31	60	--	--	--	32	50	--	--	--	59	67
T. Reaction (‡, =)	--	--	--	33	--	--	--	--	33	--	--	--	--	100	--
TAC (PROC-REL)															
Type (MANAG, FAVOR)	78	--	--	56	33	78	--	--	78	100	100	--	--	45	33
TAC (BEH-REL)															
Type (‡, NVI, WARN, =)	0	--	--	67	60	20	--	--	57	50	0	--	--	71	33
Error Type	0	--	--	67	60	20	--	--	57	50	0	--	--	71	33

*Percentage agreements which are underlined indicate calculations based on frequencies of less than 10 for a given event.

†A dash in a cell represents 100% agreement between coders that the event did not occur.

Table D II

Intercoder Reliability Measures Obtained during Data Collection with the
Low Inference Classroom Observation System

Variable	Check No.	Percentage Agreement												
		Coders 1 & 2			Coders 1 & 3						Coders 2 & 3			
		1	2	3	1	2	3	4	5	6	1	2	3	4
Academic Response Opportunity														
Type of Respondent		50*	85	--†	20	50	33	79	0	--	50	91	71	--
Question Type		88	86	--	33	55	50	83	33	--	77	89	82	33
Child Answer		50	85	--	33	52	33	89	100	--	50	90	75	--
T. Feedback on PCSS, PROD, CHOIS		50	73	--	25	66	33	74	100	--	39	76	69	--
T. Feedback on Opinion Q's		--	--	--	0	18	100	100	--	--	--	60	--	--
Student Initiated Question														
Type		72	--	--	--	50	0	57	100	43	33	--	--	40
Relevancy		72	--	--	--	50	33	71	50	60	33	--	--	60
T. Feedback		63	--	--	--	50	33	71	100	29	33	--	--	60
Student Initiated Comment														
Type		33	0	100	67	50	50	42	71	40	43	40	20	50
Relevancy		45	0	100	50	50	25	56	75	60	71	80	100	44
T. Feedback		56	0	100	33	--	27	13	57	100	71	60	60	44
Dyadic Contact														
Type		84	100	73	67	20	56	85	88	83	73	56	63	89
Child Created Contact (CCC)														
Type		62	--	69	100	0	39	40	81	80	100	0	100	80
CCC (WK-REL)														
T. Reaction (DELAY, BRIEF, LONG)		56	--	41	75	--	29	50	79	67	0	0	100	71
T. Reaction (±, ∓)		--	--	--	--	--	100	--	--	0	--	--	--	--
CCC (PERS-REL)														
Type		0	--	17	--	0	20	0	58	38	0	--	100	50
T. Reaction (ACK, DELAY)		--	--	0	--	0	20	--	33	33	0	--	--	0
T. Reaction (GRANT, NONGRANT)		0	--	20	--	--	--	0	33	--	0	--	100	20
Teacher Afforded Contact (TAC)														
Type		76	100	74	59	22	42	77	90	55	67	43	80	85
TAC (WK-REL)														
Type (OBSV, BRIEF, LONG)		46	--	33	25	--	--	67	83	50	--	--	60	40
T. Reaction (‡, ∓)		--	--	--	0	--	--	--	43	60	--	--	--	100
TAC (PROC-REL)														
Type (MANAG, FAVOR)		56	--	50	60	22	33	100	88	20	100	0	100	89
TAC (BEH-REL)														
Type (‡, NVI, WARN, ∓)		0	100	0	20	0	40	50	50	50	0	57	50	50
Error Type		0	100	0	60	--	33	50	78	50	0	45	100	50

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[*] Percentage agreements which are underlined indicate calculations based on frequencies of less than 10 for a given event.

[†] A dash in a cell represents 100% agreement between coders that the event did not occur.

APPENDIX E

TEST-RETEST RELIABILITIES FOR THE SCORES ON THE MY CLASS INVENTORY AND SCHOOL ATTITUDE TEST

TABLE E I

PEARSON PRODUCT MOMENT CORRELATIONS BETWEEN TEST-RETEST SCORES ON THE MCI

		Subscales				
Grade	N	1	2	3	4	5
1, 3 & 6	69	.63	.61	.59	.70	.53
1	21	.34	.60	.64	.53	.47
3	22	.73	.51	.51	.76	.25
6	26	.65	.74	.50	.78	.71
3 & 6	48	.69	.63	.57	.75	.50
Anderson Reliabilities						
3 & 6	655	.77	.70	.56	.56	.54

TABLE E II

PEARSON PRODUCT MOMENT CORRELATIONS BETWEEN TEST-RETEST SCORES ON THE SAT

Grade	Form	N	R
1	Oral	21	.68
3	Oral	21	.73
1 & 3	Oral	42	.70
Author's reliability			
1 & 3	Oral		.77
6	Written		.78

APPENDIX F

CORRELATIONS BETWEEN SELECTED STUDENT CONTEXT VARIABLES, PRODUCT VARIABLES, AND PERCENTAGE OF QUESTION OPPORTUNITIES

Table F I

Correlations Between Selected Student Context Variables, Product Variables, and Percentage of Question Opportunities for Class 1-1(*n*=27)

Variable Number	Name of Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1)	SES																				
(2)	IQ		248																		
(3)	MCI:	satisfaction	-054	-420*																	
(4)		friction	-102	195	-330																
(5)		competitiveness	206	164	-197	411*															
(6)		difficulty	-122	-110	008	149	117														
(7)		cohesiveness	-306	-130	019	204	131	297													
(8)	OSAT:	general school factor	-064	-342	665**	-319	-241	-039	027												
(9)		instruction interaction	-131	-030	183	010	-326	-239	060	433*											
(10)		interpersonal relationships	-197	065	137	252	083	234	441*	116	170										
(11)		Total score	-167	118	387*	-034	-298	-103	165	674**	918**	415*									
(12)	MAT:	a Word Knowledge	260	-075	231	-192	030	164	-118	097	-123	-064	-075								
(13)		b Word Analysis	087	-195	191	003	-180	041	101	126	026	-230	003	674**							
(14)		c Reading	264	097	-115	025	018	-117	-414	-249	-084	-147	-180	678**	519**						
(15)		d Total Reading (a+b)	300	002	086	-103	-011	-014	-349	-031	-022	-161	-067	869**	611**	918**					
(16)		Total (a+b+c)	239	-069	129	-074	-045	045	-162	-000	-074	-163	-096	920**	838**	837**	837**				
(17)	Grades:	Language Arts - effort	100	-176	194	-034	-221	094	-010	145	135	-061	131	573**	612**	507**	642**	650**			
(18)		- achievement	190	067	014	064	077	127	-052	121	047	089	097	782**	576**	662**	816**	784**	738**		
(19)		Total	156	-056	110	017	-075	119	-034	142	097	016	122	728**	637**	628**	784**	770**	930**	934**	
(20)	Percentage product questions		266	034	-065	-195	040	036	-097	-323	-232	032	-268	367	236	510**	477**	426*	212	367	312

Note. Decimal points are omitted.

* $p < .05$

** $p < .01$

Table F II

Correlations Between Selected Student Context Variables, Product Variables, and Percentage of Question Opportunities for Class 2-1 (n = 21)

Variable Number		Name of Variable	(1)	(2)	(3)	(4)	(5)	V (6)	a (7)	r (8)	i (9)	a (10)	b (11)	l (12)	e (13)	(14)	(15)	N (16)	u (17)	m (18)	b (19)	e (20)	r (21)	(22)	(23)	(24)
(1)	SES																									
(2)	IQ		330																							
(3)	MCI:	satisfaction	-006	271																						
(4)		friction	-128	185	-416																					
(5)		competitiveness	035	305	-177	400																				
(6)		difficulty	-017	-111	-405	197	106																			
(7)		cohesiveness	-121	-196	115	-113	159	293																		
(8)	OSAT:	general school factor	-048	-439*	-155	160	-153	367	125																	
(9)		instruction interaction	-409	-464*	-320	006	-331	181	-035	226																
(10)		interpersonal relationships	-337	-248	-151	-092	-436*	086	120	151	381**															
(11)		Total score	-412	-501*	-317	010	-387	221	013	364	976**	701**														
(12)	MAT:	a Word Knowledge	087	390	251	158	509*	-228	041	-338	-360	-249	-397													
(13)		b Word Analysis	002	294	133	267	273	-353	-005	-171	-216	-169	-237	769**												
(14)		c Reading	044	433*	320	084	468*	-490*	062	-426	-460*	-209	-485*	767**	690**											
(15)		d Total Reading (a+b)	089	471*	331	062	433*	-466*	-040	-457*	-417	-265	-461*	845**	732**	973**										
(16)		Total (a+b+c)	048	421	275	169	467*	-419	042	-365	-402	-229	-432*	911**	873**	935**	957**									
(17)	Grades:	group participation	-148	250	190	196	181	-127	083	-105	-130	-247	-172	435*	523*	445*	488*	508*								
(18)		individual participation	-239	098	226	178	105	-282	014	-118	-078	-185	-118	547*	652**	563**	609**	639**	906**							
(19)		working skills	175	-015	005	233	205	187	086	228	081	-264	048	444*	510*	214	310	391	471*	531*						
(20)		Total behavior	-182	191	217	135	161	-162	036	-182	-082	-254	-145	509*	588**	495*	550**	574**	964**	956**	534*					
(21)		Language Arts - effort	-085	295	404	014	085	-397	-122	-352	-110	-288	-200	588**	625**	561**	647**	643**	817**	881**	546*	891**				
(22)		- achievement	-111	298	423	030	066	-378	-120	-352	-127	-293	-215	565**	569**	533*	609**	604**	820**	884**	495*	897**	958**			
(23)		Total	-098	297	415	022	076	-389	-122	-353	-119	-291	-209	578**	599**	548*	630**	625**	821**	885**	521*	857**	957**	977**		
(24)	Percentage process questions		-102	095	-206	093	-056	-254	-103	-555**	238	028	120	005	217	132	145	142	090	160	-131	171	170	175	173	
(25)	Percentage product questions		-006	284	001	032	294	-005	-010	-270	-650**	-248	-626**	139	156	349	297	263	-056	-087	-302	-078	-103	-142	-123	211

Note. Decimal points are omitted.

* p < .05

** p < .01

Table F III

Correlations Between Selected Student Context Variables, Product Variables, and Percentage of Question Opportunities for

Variable Number		Name of Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	v (11)	a (12)	r (13)	i (14)	a (15)	b (16)	l (17)	e (18)	(19)	(20)	n (21)	a (22)
(1)	SES																							
(2)	IQ:	Total	223																					
(3)		Verbal	329	931**																				
(4)		Nonverbal	080	925**	723**																			
(5)	MCI:	satisfaction	134	018	165	-139																		
(6)		friction	089	-200	-243	-126	-406*																	
(7)		competitiveness	-069	-474*	-495**	-379*	-184	240																
(8)		difficulty	-216	-413*	-384*	-385*	-171	-033	375**															
(9)		cohesiveness	-129	-290	-269	-270	186	-103	-007	233														
(10)	OSAT:	general school factor	188	076	187	-050	586**	-215	-318	-336	-121													
(11)		instruction interaction	-203	-309	-250	-322	290	-393*	-130	194	253	450*												
(12)		interpersonal relationships	200	049	018	065	-008	-253	-010	147	-101	061	197											
(13)		Total score	016	-143	-064	-204	442*	-411*	-227	009	076	767**	876**	431*										
(14)	PCAS:	attitude to school	-028	151	178	101	524**	-181	-186	-400*	-369	688**	017	008	323									
(15)		interest in school work	002	150	192	076	492**	-270	-114	-186	-205	608**	039	303	384*	732**								
(16)		importance of doing well	-368	122	062	143	355	-062	-260	-046	012	314	193	-181	210	284	259							
(17)		attitude to class	043	595**	618**	489**	282	-221	-346	-293	-208	361	-151	077	092	543**	512**	316						
(18)		'other' image of class	-008	233	271	159	434*	-429*	-212	-231	-059	383*	020	184	237	660**	677**	154	545**					
(19)		conforming-nonconforming	-015	-063	015	-138	448*	-249	-374*	-462*	-135	495**	196	151	387*	538**	431*	371	296	388*				
(20)		relationship with teacher	-195	004	026	-018	530**	-222	-029	-162	109	463**	106	-081	252	623**	616**	584**	477*	602**	534**			
(21)		anxiety in class	-012	481**	472*	416*	408*	-260	-322	-421*	-299	378*	-218	-065	018	777**	603**	254	634**	684**	422*	537**		
(22)		social adjustment	055	199	200	164	287	-486**	-385*	-295	-019	336	169	161	301	350	542**	289	327	538**	540**	537**	417*	
(23)		academic self-image	124	543**	533**	469*	340	-156	-387*	-494**	-246	428*	-220	153	101	575**	643**	222	538**	661**	367	401*	757**	521**
(24)		Total score	-024	431*	450*	347	520**	-310	-379*	-421*	-223	584**	-043	098	263	816**	797**	484**	796**	784**	592**	745**	840**	631**
(25)	MAT:	a Word Knowledge	298	762**	818**	592**	108	-138	-532**	-551**	-180	126	-286	-211	-179	127	-006	-015	346	115	054	-106	364	107
(26)		b Reading	154	730**	697**	665**	186	-061	-422*	-369	-167	154	-274	-153	-143	174	057	360	499**	122	020	099	288	084
(27)		c Total Reading (a+b)	189	662**	636**	593**	195	-175	-486**	-519**	-126	154	-205	169	-009	235	172	151	388*	207	285	122	351	123
(28)		d Language	236	749**	760**	629**	186	-198	-549**	-579**	-166	171	-239	023	-064	229	139	124	425*	219	243	089	398*	175
(29)		e Spelling	297	711**	735**	587**	-054	117	-257	-340	-225	099	-331	025	-153	051	033	-049	438*	-032	-038	-135	227	015
(30)	Grades:	group participation	-050	353	334	328	355	-328	-295	-340	160	468*	210	036	351	306	302	343	244	320	356	401*	244	330
(31)		individual participation	281	560**	548**	495**	386*	-371	-421*	-289	092	413*	062	-016	220	188	197	219	218	211	139	213	232	274
(32)		working skills	267	626**	642**	526**	380*	-425*	-385*	-367	-030	560**	028	139	309	414*	430*	193	567**	423*	209	356	417*	359
(33)		Total behavior	173	547**	541**	481**	402*	-401*	-394*	-357	083	515**	112	054	317	321	330	282	361	339	233	349	316	345
(34)		Language Arts - effort	376*	734**	757**	608**	333	-226	-432*	-492**	-017	311	-101	132	115	195	175	097	455*	315	270	160	325	277
(35)		- achievement	503**	696**	753**	536**	347	-265	-465*	-455*	-078	407*	-085	249	201	235	260	120	456*	318	291	149	302	283
(36)		Total	447*	725**	764**	580**	345	-249	-455*	-480**	-049	365	-094	194	161	218	221	118*	462*	321	285	157	318	284
(37)	Percentage process questions		-185	106	-051	257	-111	064	108	-246	-343	-099	-320	-272	-319	079	026	068	-118	-283	-057	-099	063	-020
(38)	Percentage product questions		-013	-131	-128	-115	-120	081	199	143	-271	214	-147	-055	-010	209	175	-004	-063	-096	132	-068	065	043

Note. Decimal points are omitted.

* p < .05

** p < .01

1 of

Table F III

ted Student Context Variables, Product Variables, and Percentage of Question Opportunities for Class 1-3 (n = 28)

	v	a	r	i	a	b	l	e			N	u	m	b	e	r											
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
450*																											
061	197																										
767**	876**	431*																									
688**	017	008	323																								
608**	039	303	384*	732**																							
314	193	-181	210	284	259																						
361	-151	077	092	583**	512**	316																					
383*	020	184	237	660**	677**	154	545**																				
495**	196	151	387*	538**	431*	371	296	388*																			
463**	106	-081	252	623**	614**	584**	477*	602**	534**																		
378*	-218	-065	018	777**	603**	254	634**	684**	422*	537**																	
336	169	161	301	350	542**	289	327	538**	540**	537**	417*																
428*	-220	153	101	575**	643**	222	538**	661**	367	401*	757**	521**															
584**	-043	098	-265	816**	797**	484**	796**	784**	592**	743**	840**	631**	812**														
126	-284	-211	-179	127	-006	-015	346	115	054	-106	364	107	443*	268													
154	-274	-153	-143	174	057	360	499**	122	020	099	288	084	390*	367	727**												
154	-205	169	-009	235	172	151	388*	207	285	122	351	123	432*	381*	719**	770**											
171	-239	023	-064	229	139	124	425*	219	243	089	398*	175	481**	399*	886**	818**	933**										
099	-331	025	-153	051	033	-069	438*	-032	-038	-133	227	015	351	215	625**	643**	567**	616**									
468*	210	036	351	306	302	363	244	320	356	401*	244	330	397*	431*	358	489**	617**	568**	289								
413*	062	-016	220	188	197	219	218	211	139	213	232	274	341	314	571**	674**	679**	695**	372	767**							
560**	028	139	309	414*	430*	193	567**	423*	209	356	417*	359	532**	574**	485**	581**	602**	612**	482*	800**	808**						
515**	112	054	317	321	330	282	361	339	253	349	316	365	452**	469**	506**	626**	683**	674**	606*	926**	926**	931**					
311	-101	132	113	195	175	097	455*	315	270	160	325	277	488**	425*	673**	708**	760**	785**	724**	671**	773**	763**	791**				
407*	-085	249	201	233	260	120	456*	318	291	149	302	283	477*	439*	681**	714**	784**	810**	655**	639**	804**	808**	813**	965**			
365	-094	194	161	218	221	110*	462*	321	285	157	318	286	490**	438*	686**	721**	784**	809**	699**	674**	800**	797**	814**	986**	987**		
-099	-320	-272	-319	079	016	068	-118	-183	-057	-099	063	-020	138	-010	133	234	198	167	115	128	101	029	095	-070	-125	-099	
214	-147	-055	-010	209	175	-006	-063	-094	132	-068	065	043	229	068	016	024	-006	-015	067	208	069	123	142	-113	-049	-083	491*

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Table F IV

Correlations Between Selected Student Context Variables, Product Variables, and Percentage of Question Opportuni

Variable Number	Name of Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23
(1)	SES																							
(2)	IQ[a]: Total	079																						
(3)	Verbal	101	946**																					
(4)	Nonverbal	045	943**	785**																				
(5)	MCI: satisfaction	-270	-064	-105	-018																			
(6)	friction	001	211	141	267	-388*																		
(7)	competitiveness	160	-212	-263	-137	-665**	492**																	
(8)	difficulty	233	038	029	037	-400*	125	449*																
(9)	cohesiveness	-114	-259	-315	-171	173	-360*	-129	-098															
(10)	OSAT: general school factor	352	-332	-320	-301	-022	-120	-123	112	238														
(11)	instruction interaction	-013	-318	-333	-268	064	-115	-193	050	395*	436*													
(12)	interpersonal relationships	039	-168	-199	-115	378*	-386*	-468**	-356*	543**	209	390*												
(13)	Total score	121	-370*	-384*	-313	115	-214	-287	-015	482**	680**	911**	585**											
(14)	PCAS: attitude to school	121	-016	-022	-012	318	-407*	-498**	-121	255	309	092	317	250										
(15)	interest in school work	148	038	094	-032	242	-381*	-273	213	107	019	-188	129	-089	432									
(16)	importance of doing well	158	-097	-118	-053	-203	160	192	072	139	316	031	145	164	290	034								
(17)	attitude to class	091	-084	-104	-052	392*	-318	-389*	-057	670**	176	168	557**	296	663**	426*	295							
(18)	'other' image of class	-326	040	-032	130	424*	-368	-508**	-310	154	-107	171	277	147	279	133	023	181						
(19)	conforming-nonconforming	-243	-201	-144	-233	-079	-066	-099	089	201	288	223	223	306	242	160	366	185	073					
(20)	relationship with teacher	167	-234	-257	-217	-072	066	026	-180	222	051	107	183	135	122	199	250	214	266	272				
(21)	anxiety in class	-200	-071	-131	017	536**	-196	-441*	-397*	055	-022	180	367	188	106	076	-180	060	752**	081	382*			
(22)	social adjustment	-283	-176	-131	-179	148	-214	-018	-038	327	-336	-091	020	-137	088	252	228	362	251	117	361*	058		
(23)	academic self-image	-140	076	043	109	125	043	-161	-478**	028	-340	-076	328	-081	-093	084	036	142	660**	-162	432*	470*	250	
(24)	Total score	-077	-094	-128	-065	361	-236	-390*	-290	368	041	000	474**	191	696**	673**	376*	669**	628**	276	641**	520**	529**	649
(25)	MAT: a Word Knowledge	136	746**	711**	703**	-257	304	-077	-060	-318	-276	-364*	-428*	-444*	-051	-037	-011	-264	053	-236	-078	-116	-163	111
(26)	b Reading	110	848**	831**	772**	061	097	-306	-012	-330	-432*	-336	-163	-436*	-031	180	-179	-067	136	-203	-193	080	-179	120
(27)	c Total Reading (a+b)	129	853**	822**	796**	-085	222	-225	-021	-350	-312	-385*	-138	-450*	010	100	-080	-105	093	-236	-163	-040	-176	-121
(28)	d Language	-103	755**	688**	747**	139	369*	-296	-203	-136	-292	-360	-050	-363	-005	-087	-076	010	106	-220	-137	001	-217	256
(29)	e Spelling	-214	572**	570**	514**	-181	210	-017	-387	-323	-353	-425*	-266	-474*	-134	-130	037	-300	208	-036	-133	064	-002	250
(30)	Grades: group participation	324	-098	-112	-070	-493**	311	310	349	-393	236	201	-179	180	016	-163	236	-063	-216	006	051	-131	-262	-206
(31)	individual participation	195	040	-017	093	-340	307	221	499**	-101	197	036	-337	039	011	016	234	135	-105	-076	-017	-311	037	-134
(32)	working skills	049	207	165	235	-306	377*	089	001	-182	198	235	-160	180	-119	-277	166	-137	075	078	061	-086	-212	080
(33)	Total behavior	225	048	005	090	-441*	379*	243	136	-196	251	179	-213	155	-032	-139	265	-029	-182	036	052	-286	-167	-113
(34)	Language Arts - effort	-006	488**	432*	501**	-206	276	-063	-066	-141	-070	-009	-118	-059	-173	-130	300	-090	311	036	036	105	007	240
(35)	- achievement	-024	539**	503**	526**	-233	369	-056	-060	-313	-093	-030	-169	-167	-184	-138	361	-137	238	005	-028	033	-063	229
(36)	Total	-014	516**	470**	518**	-219	316	-049	-066	-178	-082	-030	-144	-083	-180	-155	282	-116	276	030	086	071	-029	240
(37)	Percentage process questions	-135	260	245	249	186	-010	-387	-162	-129	128	052	025	009	291	073	001	386	105	016	-121	032	030	130
(38)	Percentage product questions	142	261	289	202	181	092	-313	161	-376*	009	-173	-213	-163	166	132	-061	133	008	-136	-113	-079	160	-119

Note. Decimal points are omitted.

[a] Correlations with IQ scores are based on 30 students.

* p < .05

** p < .01

Table F IV

ween Selected Student Context Variables, Product Variables, and Percentage of Question Opportunities for Class 3-3 (n = 31)

Variable Number																											
(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)
626*																											
209	399*																										
680**	721**	585**																									
309	092	337	250																								
019	-188	129	-089	432																							
316	071	165	164	290	026																						
176	168	557**	296	663**	424*	295																					
-107	171	277	147	278	133	025	181																				
288	323	323	306	242	160	344	165	073																			
051	107	183	133	122	199	250	214	246	272																		
-032	188	367	196	106	076	-180	068	763**	001	382*																	
-236	-091	030	-137	064	352	228	362	231	127	381*	035																
-248	-016	220	-081	-095	084	034	142	469**	-162	432*	439*	250															
041	090	674**	191	696**	673**	376*	669**	628**	276	661**	528**	529**	649**														
-276	-364*	-426*	-444*	-051	-037	-011	-264	093	-236	-078	-116	-143	111	-113													
-432*	-316	-163	-436*	-031	180	-179	-067	134	-245	-193	003	-179	120	-040	780**												
-312	-385*	-338	-430*	020	108	-080	-105	093	-226	-163	-068	-174	-121	-043	936**	923**											
-232	-340	-050	-343	-005	-087	-074	010	106	-120	-137	061	-217	254	030	714**	733**	777**										
-353	-429*	-266	-474*	-134	-136	037	-300	208	-036	-133	066	-002	230	-018	666**	514**	602**	608**									
236	201	-179	180	014	-165	236	-063	-216	086	091	-131	-262	-206	-173	078	-038	025	-055	063								
197	036	-217	039	011	016	254	135	-105	-074	-017	-311	037	-136	-066	212	103	176	157	089	689**							
198	335	-160	188	-119	-277	144	-137	073	078	061	-086	-212	080	-059	420	240	341	376	421*	636**	559**						
251	179	-213	153	-032	-139	265	-029	-182	036	052	-286	-167	-113	-110	262	109	199	171	201	906**	865**	837**					
-070	-009	-118	-019	-173	-130	300	-090	311	056	036	105	007	346	146	581**	473**	551**	519**	712**	344	411*	716**	552**				
-093	-050	-169	-107	-184	-138	361	-137	238	005	-026	035	-065	229	071	640**	538**	614**	613**	734**	371	447*	762**	593**	977**			
-082	-030	-144	-083	-180	-133	300	-116	274	030	006	071	-029	240	110	616**	508**	586**	569**	726**	359*	431*	763**	575**	986**	994**		
138	052	025	000	291	073	001	284	103	058	-121	033	030	138	173	212	199	206	256	332	012	069	164	090	237	246	242	
020	-173	-213	-163	104	132	-061	155	010	-134	-113	-079	260	-219	-025	251	132	287	171	069	038	336	-025	133	135	154	145	233

Table

Correlations Between Selected Student Context Variables, Product Var

Variable Number	Name of Variable																	Variabl		
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1)	SES																			
(2)	IQ: Total	−067																		
(3)	Verbal	078	809**																	
(4)	Nonverbal	−180	837**	357																
(5)	MCI: satisfaction	074	017	−211	218															
(6)	friction	166	038	238	−153	310														
(7)	competitiveness	041	−273	−181	−258	−236	220													
(8)	difficulty	−057	051	−001	084	−202	242	−218												
(9)	cohesiveness	248	−180	−050	−242	−008	−104	071	−141											
(10)	VSAT: interpersonal relationships	213	−119	−167	−033	117	−092	049	−334	104										
(11)	instruction interaction	030	326	400*	148	296	245	−277	−166	−254	268									
(12)	general school factor	147	377	462*	182	−006	122	−183	211	−147	334	585**								
(13)	Total score	119	324	394	156	212	183	−235	−098	−196	509**	913**	820**							
(14)	PCAS: attitude to school	039	348	333	258	042	−202	−067	−407	192	348	446*	561**	569**						
(15)	interest in school work	223	403*	450*	223	242	−036	−253	031	−240	240	591**	742**	707**	563**					
(16)	importance of doing well	−056	131	129	091	−131	034	−122	−010	−176	280	209	440*	358	573**	319				
(17)	attitude to class	067	−311	−021	−478*	199	−234	392	−484*	154	124	156	−017	119	087	134	−030			
(18)	'other' image of class	147	−407*	−461*	−227	371	−334	076	−146	−120	277	−046	−180	−038	000	175	087	418		
(19)	conforming-nonconforming	050	130	316	−103	−278	311	100	151	045	−161	112	097	073	029	314	219	060	087	
(20)	relationship with teacher	037	−013	269	−272	−193	111	041	−248	285	071	−149	−026	−090	−018	−022	−149	132	−391	−126
(21)	anxiety in class	300	177	338	−038	163	−039	−544**	−158	131	010	285	177	251	054	195	010	−063	−196	−177
(22)	social adjustment	200	261	390	054	157	−180	−049	−354	203	483	123	357	251	357	333	013	158	−078	−079
(23)	academic self-image	222	364	503*	112	−204	−079	115	−359	−031	274	237	518**	404*	609**	457*	302	147	−051	283
(24)	Total score	235	154	417*	−144	055	−181	069	−500*	035	343	370	492*	493*	642**	612**	416*	565**	230	261
(25)	MAT: a Word Knowledge	−195	621**	826**	215	−228	233	−054	161	−179	−313	324	334	273	104	292	163	104	−459*	380
(26)	b Reading	036	607**	780**	238	−035	300	−089	073	−193	−078	387	474*	409*	217	491*	142	048	−344	341
(27)	c Total Reading (a + b)	−055	628**	828**	225	−133	294	−061	131	−203	178	351	445*	354	154	419*	152	068	−410*	383
(28)	d Language	059	695**	714**	441*	−128	113	−340	258	−167	110	239	623**	410*	283	532**	252	−301	−313	256
(29)	e Spelling	−079	472*	657**	145	−337	193	−050	175	253	039	148	551**	309*	301	314	318	−199	−571**	327
(30)	Total (a + b + d + e)	−055	667**	843**	274	−237	246	−132	189	−016	−049	297	591**	401*	279	457*	272	−117	−519**	380
(31)	Grades: group participation	−182	517**	544**	321	−089	−099	−266	213	−236	−151	−004	276	069	281	173	139	−381	−555**	−163
(32)	individual participation	−050	510**	529**	327	−208	−214	−228	141	−240	156	181	519**	344	425*	298	238	−141	−416*	−312
(33)	working skills	−143	603**	639**	374	−317	−080	−272	153	−042	004	108	462**	243	371	239	270	−307	−556**	−168
(34)	Total behavior	−133	568**	597**	356	−321	−136	−268	178	−184	−001	097	435**	225	374	246	224	−292	−534**	−223
(35)	Language Arts – effort	−046	484*	545**	272	−359	−078	−323	270	−148	077	167	553**	330	346	313	282	−286	−528**	−208
(36)	– achievement	034	517**	654**	223	−339	−012	−281	216	−000	047	195	632**	371	364	340	296	−207	−589**	−137
(37)	Total	−003	507**	609**	248	−352	−043	−304	244	−070	062	183	601**	356	359	331	292	−266	−567**	−172
(38)	Percentage process questions	053	047	130	−046	−156	002	−093	110	−050	196	093	126	148	040	−077	376	173	134	059
(39)	Percentage product questions	207	−279	−289	−176	−101	−314	−158	181	022	−144	−348	−152	−310	−116	−185	004	095	262	−184

Note. Decimal points are omitted.

*p < .05

**p < .01

Table F V

cted Student Context Variables, Product Variables, and Percentage of Question Opportunities for Class 1-6 (n = 25)

Variable Number																								
(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)
563**																								
573**	319																							
087	134	-030																						
000	175	087	418																					
029	314	219	060	087																				
-018	-022	-149	132	-391	-126																			
054	195	010	-063	-196	-177	398*																		
357	333	013	158	-078	-079	432*	487*																	
609**	457*	302	147	-051	283	197	297	537**																
642**	612**	416*	565**	230	261	297	352	607**	799**															
104	292	163	104	-439*	380	173	215	241	302	293														
217	491*	142	048	-344	341	392	363	453*	458*	464*	781**													
154	419*	152	068	-410*	383	330	319	384	426*	412*	911**	966**												
283	532**	252	-301	-313	256	158	296	400*	474*	311	560**	773**	734**											
301	314	318	-199	-571**	327	305	179	310	481*	305	606**	560**	615**	653**										
279	457*	272	-117	-519**	380	319	292	406*	512**	399*	829**	869**	904**	847**	877**									
281	173	139	-381	-555**	-163	375	269	173	201	044	457*	379	431*	499*	488*	488*								
423*	298	238	-141	-416*	-312	286	296	261	360	231	444*	443*	468*	579**	478*	838**	838**							
371	239	270	-387	-556**	-168	399*	403*	351	382	230	531**	510**	543**	622**	665**	903**	856**	856**						
374	246	224	-292	-534**	-223	371	336	271	319	179	499*	463*	502*	591**	568**	960**	940**	963**	963**					
344	313	282	-286	-528**	-208	348	391	230	309	193	465*	440*	473*	592**	566**	896**	928**	927**	960**	960**				
364	340	296	-207	-589**	-137	399*	469*	369	427*	312	551**	521**	562**	644**	699**	821**	883**	923**	916**	959**	959**			
359	331	292	-246	-567**	-172	379	437*	307	378	259	516**	488*	526**	626**	663**	863**	914**	934**	946**	988**	991**	991**		
040	-077	376	173	134	059	-229	-072	-121	-091	057	174	123	160	283	029	142	067	260	103	141	146	136	142	
-116	-185	004	-093	262	-184	013	063	-113	-102	-026	-114	-114	-192	-070	-371	-281	-019	076	-039	006	066	-025	009	387

2 of 2

Table F VI

Correlations Between Selected Student Context Variables, Product Variables, and Percenta

Variable Number	Name of Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	V (13)	a (14)	r (15)	i (16)	a (17)	b (18)	l (19)	e (20)
(1)	SES																					
(2)	IQ^a:	Total	370																			
(3)		Verbal	432*	925**																		
(4)		Nonverbal	241	912**	688**																	
(5)	MCI:	satisfaction	169	210	155	223																
(6)		friction	071	099	262	-084	-495*															
(7)		competitiveness	-001	136	158	101	-390	448*														
(8)		difficulty	030	-083	-009	-148	140	-059	-023													
(9)		cohesiveness	020	-146	-184	-092	423*	-567**	-420*	066												
(10)	WSAT:	interpersonal relationships	057	-104	010	-226	446*	-351	-386	277	492*											
(11)		instruction interaction	242	-143	-114	-160	271	-240	-372	-489*	204	244										
(12)		general school factor	-016	-404*	-411*	-331	168	046	-131	-196	-079	005	559**									
(13)		Total score	171	-265	-213	-289	377	-254	-412*	-298	264	482*	924**	708**								
(14)	PCAS^a:	attitude to school	006	-193	-206	-155	498*	-173	-420*	-258	071	208	573**	719**	688**							
(15)		interest in school work	062	-028	016	-085	344	-077	-217	-353	-009	238	641**	585**	696**	677**						
(16)		importance of doing well	429*	-119	-214	002	-058	-223	-153	-352	060	-166	597**	426*	487*	129	168					
(17)		attitude to class	371	253	250	203	585**	-399	-261	-019	300	361	204	231	326	387	412*	127				
(18)		'other' image of class	234	209	206	179	152	-071	029	041	-100	167	153	224	230	365	299	-036	412*			
(19)		conforming-nonconforming	395	-039	-159	095	219	-347	-086	025	-010	-139	237	201	181	094	169	476*	226	077		
(20)		relationship with teacher	071	-181	-277	-056	257	-212	-321	-445*	032	362	571**	568**	589**	484*	412*	496*	318	-144	388	
(21)		anxiety in class	-128	371	242	446*	038	-153	-218	-238	413*	-091	-017	-368	-166	-202	-087	-138	-025	-041	-289	-123
(22)		social adjustment	038	186	112	222	371	-377	-514*	040	544**	579**	093	026	251	177	000	017	349	031	-155	064
(23)		academic self-image	236	562**	504*	526**	313	-091	-177	-311	142	225	112	-181	082	-073	143	070	202	072	-152	-081
(24)		Total score	383	324	217	372	563**	-406*	-452*	-414*	304	312	574**	373	602**	486*	570**	456*	699**	323	275	516**
(25)	MAT^a:	a Word Knowledge	036	630**	741**	410*	-056	338	173	341	-200	064	-296	-260	-263	-236	-075	-293	310	464**	-190	-420*
(26)		b Reading	-125	736**	702**	656**	-127	-023	136	-114	004	-132	-282	-578**	-424*	-376	-166	-185	118	272	-145	-476*
(27)		c Total Reading (a+b)	-059	747**	803**	568**	-101	221	209	176	-164	-052	-323	-417*	-371	-315	-088	-302	233	420*	-175	-507*
(28)		d Language	-172	686**	594**	673**	120	-202	-177	-255	086	-159	-167	-482*	-325	-124	-099	-224	276	077	-116	-116
(29)		e Spelling	-081	693**	679**	593**	223	-055	-204	-216	079	056	-038	-409*	-148	060	-025	-235	354	342	-178	-113
(30)		Total (a+b+d+e)	-087	813**	815**	678**	047	045	-012	-046	-021	-033	-232	-499*	-334	-195	-104	-282	222	368	-192	-342
(31)	SAT^a:	Social Studies	-150	821**	855**	647**	032	172	167	017	-085	-034	-337	-503*	-404*	-333	012	-420*	260	149	-274	-365
(32)	Grades:	group participation	160	330	238	378	304	-433*	-213	-319	293	024	287	-004	194	070	183	252	377	070	146	282
(33)		individual participation	151	648**	574**	623**	351	-226	-223	-175	294	121	002	-277	-054	048	083	-127	369	312	-114	-086
(34)		working skills	200	651**	581**	619**	343	-291	-225	-294	342	114	252	-242	119	093	194	004	255	144	-023	037
(35)		Total behavior	180	581**	497*	578**	357	-336	-236	-275	329	093	181	-188	084	074	-160	042	364	195	-000	079
(36)		Language Arts - effort	091	723**	627**	707**	223	-092	031	-260	069	-130	085	-209	-057	061	133	-107	281	253	-101	042
(37)		- achievement	066	742**	684**	686**	276	-133	-094	-167	163	-018	029	-235	-067	047	057	-141	365	351	-104	-036
(38)		Total	082	742**	666**	704**	263	-123	-043	-212	129	-063	058	-231	-061	052	094	-124	334	308	-099	001
(39)		Social Studies - effort	093	707**	557**	749**	289	-183	057	-365	165	-182	081	-222	-081	-055	092	061	333	-075	060	128
(40)		- achievement	062	688**	607**	660**	286	-082	-178	-356	215	-041	099	-228	-025	069	077	-027	375	115	-054	115
(41)		Total	079	722**	605**	728**	299	-134	-072	-375	200	-111	095	-234	-053	011	087	015	368	026	-000	126
(42)	Percentage process questions		113	231	392	021	041	364	163	016	-084	-125	116	-038	023	004	073	-082	-195	147	069	-142
(43)	Percentage product questions		326	364	419*	245	046	-026	-139	-138	298	-132	267	-144	084	-208	128	331	176	100	081	-074

Note: Decimal points are omitted.

[a] Correlations are based on 24 students.

* $p < .05$

** $p < .01$

Table F VI

xt Variables, Product Variables, and Percentage of Question Opportunities for Class 2-6 (n = 25)

r	i	a	b	l	e			m	u	m	b	e	r														
(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)	(42)
168																											
412*	127																										
299	-036	412*																									
169	476*	224	077																								
412*	496*	318	-144	388																							
-087	-138	-025	-041	-289	-123																						
000	017	349	031	-155	066	257																					
143	070	202	072	-152	-081	410*	531**																				
570**	456*	699**	323	275	516**	224	539**	624**																			
-075	-293	310	464**	-190	-420*	069	-005	182	016																		
-166	-185	118	272	-145	-474*	429*	181	469*	127	580**																	
-088	-302	233	420*	-175	-507*	233	033	296	036	914**	841**																
-099	-224	276	077	-116	-116	534**	295	411*	274	355	766**	567**															
-025	-235	354	342	-178	-113	491*	285	428*	352	504*	703**	642**	800**														
-104	-282	222	368	-192	-362	432*	213	432*	222	756**	891**	895**	835**	890**													
012	-420*	260	149	-274	-365	416*	097	490*	138	745**	753**	834**	686**	618**	832**												
183	252	377	070	146	282	446*	267	390	555**	030	428*	197	588**	423*	407*	272											
083	-127	369	312	-114	-086	544**	378	574**	486*	419*	747**	597**	787**	813**	807**	615**	759**										
194	004	255	144	-023	037	558**	302	517**	485*	296	671**	502**	740**	731**	705**	563**	766**	895**									
-160	042	364	195	-000	079	552**	342	532**	547**	270	663**	466*	758**	706**	690**	520**	902**	953**	945**								
133	-107	281	253	-101	042	621**	122	303	353	392	633**	568**	733**	778**	741**	608**	663**	783**	826**	809**							
057	-141	365	351	-104	-036	586**	171	344	372	493*	692**	650**	764**	851**	825**	656**	664**	859**	822**	839**	906**						
094	-124	334	308	-099	001	605**	153	332	371	453*	673**	620**	758**	826**	796**	642**	683**	848**	868**	849**	969**	982**					
092	061	333	-073	060	128	470*	194	438*	428*	239	557**	443*	687**	617**	603**	580**	557**	640**	741**	687**	781**	683**	747**				
077	-027	375	115	-054	115	562**	262	430*	463*	348	615**	529**	717**	862**	746**	560**	560**	789**	787**	762**	828**	865**	871**	844**			
087	015	368	026	-000	126	537**	238	450*	462*	307	609**	506*	728**	773**	703**	590**	582**	749**	797**	757**	840**	813**	847**	954**	966**		
073	-082	-195	147	069	-142	-150	-295	-081	-169	201	135	224	-057	169	150	129	-198	048	114	-016	118	208	171	029	173	110	
128	331	176	100	081	-074	449	-036	254	286	292	475	400	332	336	422*	365	555**	529**	542**	580**	472*	549**	529**	389	496*	465*	383

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APPENDIX G

MEANS AND VARIANCES OF SELECTED CONTEXT AND PRODUCT VARIABLES AND PERCENTAGE OF QUESTION OPPORTUNITIES

Table G I

Means and Variances of Selected Context and Product Variables and Percentage of Question Opportunities for Class 1-1 (n=27)

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		51.56	231.93
IQ		111.18	278.30
PRODUCT: Attitudes			
MCI:	satisfaction	21.07 (9-27)	12.59
	friction	20.63 (9-27)	17.20
	competitiveness	22.26 (9-27)	11.01
	difficulty	15.74 (9-27)	11.01
	cohesiveness	21.74 (9-27)	13.38
OSAT:	general school factor	16.74 (5-20)	7.01
	instruction interaction	65.04 (21-84)	35.15
	interpersonal relationships	9.56 (4-12)	4.17
	Total score	91.93 (29-116)	65.26
PRODUCT: Achievement			
MAT[a]	Word Knowledge	53.89	124.25
	Word Analysis	48.33	83.26
	Reading	51.52	80.99
	Total Reading	50.67	77.26
Grades:	group participation	7.85 (4-16)	0.57
	individual participation	7.85 (4-16)	0.57
	working skills	5.96 (3-12)	0.48
	Total	21.67 (11-44)	4.52
	Language Arts - effort	13.41 (6-24)	4.46
	- achievement	12.56 (6-24)	4.76
	Total	25.96 (12-48)	16.04
QUESTION OPPORTUNITIES			
Percentage of process questions		0.08	0.14
Percentage of product questions		3.63	4.38

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] Values for the Metropolitan Achievement Test are based on standard scores.

Table G II

Means and Variances of Selected Context and Product Variables

and Percentage of Question Opportunities for Class 2-1 (n=21)

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		41.35	78.57
IQ		115.33	249.46
PRODUCT: Attitudes			
MCI:			
	satisfaction	23.57 (9-27)	2.72
	friction	19.19 (9-27)	16.34
	competitiveness	19.48 (9-27)	8.34
	difficulty	14.24 (9-27)	9.32
	cohesiveness	23.86 (9-27)	5.93
OSAT:	general school factor	18.29 (5-20)	1.92
	instruction interaction	71.00 (21-84)	60.29
	interpersonal relationships	10.14 (4-12)	3.46
	Total score	99.43 (29-116)	88.06
PRODUCT: Achievement			
MAT[a]:	Word Knowledge	52.58	88.75
	Word Analysis	47.90	87.51
	Reading	50.24	248.94
	Total Reading	49.81	141.20
Grades:	group participation	9.67 (4-16)	4.53
	individual participation	10.24 (4-16)	5.99
	working skills	6.91 (3-12)	5.76
	Total	27.33 (11-44)	42.46
	Language Arts - effort	14.75 (6-24)	7.78
	- achievement	14.86 (6-24)	8.11
	Total	29.60 (12-48)	31.58
QUESTION OPPORTUNITIES			
Percentage of process questions		1.16	3.01
Percentage of product questions		5.60	17.21

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] Values for the Metropolitan Achievement Test are based on standard scores.

Table G III

Means and Variances of Selected Context and Product Variables and Percentage of Question Opportunities for Class 1-3 (n = 28)

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		47.23	162.26
IQ:	Total	114.25	187.26
	Verbal	112.32	217.22
	Nonverbal	115.61	212.95
PRODUCT: Attitudes			
MCI:	satisfaction	19.50 (9-27)	27.04
	friction	20.00 (9-27)	18.43
	competitiveness	22.64 (9-27)	10.59
	difficulty	14.14 (9-27)	9.26
	cohesiveness	22.07 (9-27)	4.42
OSAT:	general school factor	15.36 (5-20)	6.94
	instruction interaction	67.14 (21-84)	12.98
	interpersonal relationships	9.86 (4-12)	2.69
	Total score	92.36 (29-116)	34.02
PCAS:	attitude to school	2.93 (0-6)	3.71
	interest in school work	2.96 (0-6)	2.46
	importance of doing well	7.36 (0-10)	3.52
	attitude to class	10.29 (0-16)	18.35
	'other' image of class	2.82 (0-6)	1.79
	conforming-nonconforming	3.39 (0-5)	1.52
	relationship with teacher	2.43 (0-6)	2.03
	anxiety in class	3.18 (0-6)	2.08
	social adjustment	2.25 (0-5)	1.83
	academic self-image	11.25 (0-18)	12.69
	Total score	48.86 (0-84)	222.84
PRODUCT: Achievement			
MAT[a]:	Word Knowledge	72.21	100.38
	Reading	67.79	184.81
	Total Reading	74.18	165.72
	Language	72.75	127.54
	Spelling	74.07	96.21
Grades:	group participation	10.36 (4-16)	5.57
	individual participation	10.82 (4-16)	5.24
	working skills	7.55 (3-12)	4.27
	Total behavior	28.73 (11-44)	38.81
	Language Arts - effort	15.50 (6-24)	9.30
	- achievement	15.02 (6-24)	9.97
	Total	30.52 (12-48)	37.47
QUESTION OPPORTUNITIES			
Percentage of process questions		4.61	15.22
Percentage of product questions		13.85	66.33

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] Values for the Metropolitan Achievement Test are based on standard scores.

Table G IV

Means and Variances of Selected Context and Product Variables and Percentage of Question Opportunities for Class 2-3 (n = 31)

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		52.27	253.71
IQ[a]:	Total	110.60	253.77
	Verbal	111.40	290.24
	Nonverbal	109.20	279.69
PRODUCT: Attitudes			
MCI:	satisfaction	24.55 (9-27)	5.86
	friction	19.39 (9-27)	16.62
	competitiveness	21.39 (9-27)	15.85
	difficulty	12.87 (9-27)	9.79
	cohesiveness	20.72 (9-27)	18.77
OSAT:	general school factor	16.45 (5-20)	4.83
	instruction interaction	73.32 (21-84)	19.19
	interpersonal relationships	9.90 (4-12)	2.47
	Total score	98.68 (29-116)	41.57
PCAS:	attitude to school	4.84 (0-6)	1.56
	interest in school work	4.23 (0-6)	1.92
	importance of doing well	7.90 (0-10)	2.73
	attitude to class	13.45 (0-16)	9.41
	'other' image of class	3.58 (0-6)	1.92
	conforming-nonconforming	3.71 (0-5)	1.04
	relationship with teacher	4.26 (0-6)	2.38
	anxiety in class	2.61 (0-6)	3.08
	social adjustment	2.39 (0-5)	1.46
	academic self-image	11.58 (0-18)	14.82
	Total score	58.55 (0-84)	103.15
PRODUCT: Achievement			
MAT[b]:	Word Knowledge	72.55	85.80
	Reading	75.06	80.06
	Total Reading	71.26	172.06
	Language	71.94	122.25
	Spelling	71.55	95.22
Grades:	group participation	12.00 (4-16)	3.36
	individual participation	11.55 (4-16)	3.02
	working skills	8.55 (3-12)	2.51
	Total behavior	32.10 (11-44)	20.15
	Language Arts - effort	18.13 (6-24)	3.40
	- achievement	18.03 (6-24)	3.26
	Total	36.16 (12-48)	13.17
QUESTION OPPORTUNITIES			
Percentage of process questions		0.69	1.14
Percentage of product questions		1.44	2.20

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] IQ score values are based on an *n* of 30.

[b] Values for the Metropolitan Achievement Test are based on standard scores.

Table G V

Means and Variances of Selected Context and Product Variables and Percentage of Question Opportunities for Class 1-6

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		47.70	283.49
IQ:	Total	104.56	90.09
	Verbal	97.72	128.52
	Nonverbal	110.80	139.92
PRODUCT: Attitudes			
MCI:	satisfaction	18.76 (9-27)	24.42
	friction	20.44 (9-27)	11.05
	competitiveness	19.72 (9-27)	14.68
	difficulty	14.60 (9-27)	10.88
	cohesiveness	18.40 (9-27)	10.41
WSAT:	interpersonal relationships	18.48 (9-27)	4.01
	instruction interaction	58.76 (26-78)	36.26
	general school factor	24.56 (11-33)	12.57
	Total score	101.80 (46-138)	89.04
PCAS:	attitude to school	3.00 (0-6)	2.40
	interest in school work	2.48 (0-6)	1.21
	importance of doing well	6.88 (0-10)	2.35
	attitude to class	9.32 (0-16)	12.78
	'other' image of class	2.80 (0-6)	1.76
	conforming-nonconforming	2.52 (0-5)	0.81
	relationship with teacher	3.24 (0-6)	2.10
	anxiety in class	3.52 (0-6)	2.09
	social adjustment	2.84 (0-5)	1.17
	academic self-image	11.24 (0-18)	11.78
	Total score	47.84 (0-84)	84.69
PRODUCT: Achievement			
MAT[a]:	Word Knowledge	82.76	41.62
	Reading	82.32	71.50
	Total Reading	83.00	51.84
	Language	85.56	40.73
	Spelling	82.00	177.36
Grades:	group participation	10.24 (4-16)	7.62
	individual participation	9.76 (4-16)	6.50
	working skills	6.96 (3-12)	6.28
	Total behavior	26.96 (11-44)	55.64
	Language Arts - effort	15.14 (6-24)	13.67
	- achievement	14.42 (6-24)	17.79
	Total	29.56 (12-48)	61.37
QUESTION OPPORTUNITIES			
Percentage of process questions		5.21	30.44
Percentage of product questions		5.69	26.86

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] Values for the Metropolitan Achievement Test are based on standard scores.

Table G VI

Means and Variances of Selected Context and Product Variables and Percentage of Question Opportunities for Class 2-6 (n = 25)

Type and Name of Variable		Mean	Variance
CONTEXT			
SES		49.50	188.04
IQ[a]:	Total	113.08	234.24
	Verbal	110.50	301.33
	Nonverbal	115.29	255.45
PRODUCT:	Attitudes		
MCI:	satisfaction	21.96 (9-27)	13.16
	friction	20.20 (9-27)	20.80
	competitiveness	19.56 (9-27)	21.93
	difficulty	13.32 (9-27)	10.14
	cohesiveness	21.28 (9-27)	17.24
WSAT:	interpersonal relationships	20.12 (9-27)	12.19
	instruction interaction	58.52 (26-78)	51.05
	general school factor	23.48 (11-33)	13.77
	Total score	102.12 (46-138)	118.99
PCAS[a]:	attitude to school	3.71 (0-6)	1.62
	interest in school work	3.08 (0-6)	1.41
	importance of doing well	7.38 (0-10)	3.73
	attitude to class	13.25 (0-16)	7.19
	'other' image of class	2.08 (0-6)	1.08
	conforming-nonconforming	2.00 (0-5)	1.08
	relationship with teacher	4.00 (0-6)	3.83
	anxiety in class	2.21 (0-6)	1.92
	social adjustment	3.00 (0-5)	1.67
	academic self-image	11.46 (0-18)	15.58
	Total score	52.17 (0-84)	83.80
PRODUCT:	Achievement		
MAT[a]:	Word Knowledge	94.29	165.37
	Reading	96.88	110.28
	Total Reading	96.58	135.41
	Language	93.75	74.69
	Spelling	91.42	157.99
SAT[a]:	Social studies	186.25	176.94
Grades:	group participation	11.26 (4-16)	8.98
	individual participation	11.38 (4-16)	11.47
	working skills	8.78 (3-12)	6.64
	Total behavior	31.42 (11-44)	69.95
	Language Arts - effort	18.02 (6-24)	12.17
	- achievement	16.80 (6-24)	21.46
	Total	34.80 (12-48)	62.71
QUESTION OPPORTUNITIES			
Percentage of process questions		2.96	4.19
Percentage of product questions		3.66	7.59

Note. Parentheses enclose the range of possible scores for attitude scales and grades.

[a] Values are based on an *n* of 24. Values for the Metropolitan Achievement Test and Stanford Achievement Test are based on standard scores.